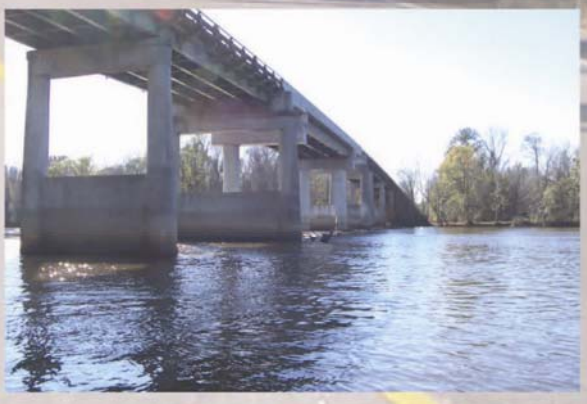
US 701 Bridge Replacement Project over the Great Pee Dee River, Great Pee Dee River Overflow and Yauhannah Lake

Horry and Georgetown Counties, South Carolina

Environmental Assessment and Programmatic 4(f) Evaluation for the Waccamaw National Wildlife Refuge



File No. 22.124 B
Project No. BR88(044)
PIN 30688X

US 701 Bridge Replacement Project Over the Great Pee Dee River, Great Pee Dee River Overflow, and Yauhannah Lake
Horry and Georgetown Counties, South Carolina

ENVIRONMENTAL ASSESSMENT AND PROGRAMMATIC 4(f) EVALUATION FOR THE WACCAMAW NATIONAL WILDLIFE REFUGE

Submitted by the
U.S. Department of Transportation
Federal Highway Administration
and
S.C. Department of Transportation

In cooperation with
United States Fish and Wildlife Service
and
United States Coast Guard

7-31-13
Date of Approval

S.C. Department of Transportation

7-31-13
Date of Approval

Federal Highway Administration

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Environmental Commitments

The Department's environmental personnel and engineers worked closely together to incorporate suggestions from citizens and regulatory and resource agencies to avoid and minimize impacts to the surrounding human and natural environments during the project's design and development. Project commitments to avoid and minimize impacts include:

1) SCDOT will employ the following avoidance measures regarding both the shortnose sturgeon (*Acipenser brevirostrum*) and the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus):*

    a) A seasonal construction moratorium for all in-water work related to the bridge replacement project will be implemented for the period of January 1 through April 15. In-water work is defined as any activity (e.g. excavation, fill, pile driving, drilled shaft construction) that could result in the physical destruction or alteration of important spawning habitats. During the moratorium, the contractor would be allowed to work from a barge in order to construct columns, caps, and bridge superstructure. The contractor would be allowed to move barges between shafts during the moratorium; however, barges must be secured by cables as placement of spuds to secure barges will not be allowed during the moratorium. Equipment and materials used during the construction of the bridge will not obstruct or impede passage through more than 50 percent of the channel. This restriction will allow the migratory pathway to remain open while both shortnose sturgeon and Atlantic sturgeon are likely to be migrating, see Page 31.

2) Standard sediment control measures will be implemented by the contractor, see Page 32.

3) The stipulations outlined in the Memorandum of Agreement (MOA) between the Department, the State Historic Preservation Office (SHPO), the Federal Highway Administration (FHWA), the United States Fish and Wildlife Service (USFWS), and the Catawba Indian Nation Tribal Historic Preservation Officer (CIN-THPO), dated 6/20/2012 will be implemented by the Department. They are:

    a) The southern bridge approach has substantially impacted a small portion of 38GE18. The project's "area of potential effect" will be limited to this area. To protect the adjacent intact portion of 38GE18, the FHWA and SCDOT will ensure that the boundaries of archaeological site 38GE18 are identified as a "Restricted Area" on all construction plans. The construction plans will include the following notation, "no ground-disturbing activities, including construction, heavy equipment access, and storage for equipment and materials are allowed within the Restricted Area." SCDOT will also inform the selected contractor about these restrictions at the Pre-Construction meeting where all special provisions are discussed.

b) SCDOT's contractor will erect orange tree-saving fencing at the edge of the project's construction limits within the boundaries of archaeological site 38GE18 to clearly indicate the location of the "Restricted Area" as shown on the construction plans.

c) All construction activities within the boundaries of archaeological site 38GE18 will be monitored by a professional archaeologist who meets the Secretary of the Interior's Professional Qualification Standards for Archaeology. (48 FR 44738-39).

d) SCDOT will provide the FHWA, the USFWS, the SHPO, and the CIN-THPO with a written report that describes the results of monitoring activities.

All work within the boundaries of archaeological site 38GE18 will cease immediately if unanticipated cultural materials or human skeletal remains are discovered during construction monitoring activities. SCDOT will immediately inform the USFWS, the FHWA, the SHPO and the CIN-THPO about the late discovery.

4) The stipulations outlined in the letter to Horry County, dated October 22, 2012, regarding the Horry County public boat landing will be implemented by the Department. With the selection of the preferred alternative, the boat landing will be removed and relocated. But at times that are safe and practical, SCDOT maintains its previous commitment of keeping the existing or the relocated boat ramp accessible during construction. See the Appendix B, Page B-113.

5) The general conditions and specifications for an Individual Permit from the Corps of Engineers for wetland encroachment will be implemented. The permit will be obtained by the Department, see Page 40.

6) The contractor will utilize 2:1 slopes in wetland areas where appropriate, and reclamation of wetland areas temporarily lost through construction activities will involve returning disturbed areas to their original elevations to the extent practicable, allowing for adjacent vegetation to naturally reclaim the area, see Page 37.

7) To mitigate for unavoidable wetland impacts, SCDOT will follow the Corps of Engineers SOPs to locate and acquire an appropriate property that will generate the compensatory mitigation credits required to compensate for unavoidable impacts associated with the proposed bridge replacements, see Page 37.

8) SCDOT will comply with the intent of Presidential Executive Order on Invasive Species 13112, of February 3, 1999, by formulating a plan to actively re-plant native vegetation for all temporarily disturbed areas. The plan will include planting fast growing, locally native plant species to minimize the potential for establishment of aggressive, invasive species, see Page 38.

9) The Department will test the UST sites along the project corridor for potential contamination before construction begins, see Page 55.

10) SCDOT will provide noise data to local authorities.

11) Coast Guard permit will be obtained, see Page 40.

12) The Department will comply with the Migratory Bird Treaty Act of 1918 in regard to the avoidance of taking of individual migratory birds and the destruction of their active nests. Prior to construction/demolition of the bridges the district personnel/contractor will coordinate with SCDOT Environmental Management Office to determine if there are any active nests on the bridge. After this coordination, it will be determined whether construction/demolition can begin. After construction/demolition has begun, measures can be taken to prevent birds from nesting, such as netting, noise producers, and etc. If during construction or demolition a nest is observed on the bridge that was not discovered during the biological surveys, the contractor will cease work and immediately notify the SCDOT Environmental Management Office. SCDOT biologists will determine whether the nest is active and the species utilizing the nest. After this coordination, it will be determined whether construction/demolition can resume or whether a temporary moratorium will be put into effect, see Page 46.

13) If existing bridge demolition activities are expected to occur in late fall to early winter, which is the typical maternal roosting period of the Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), prior to performing demolition work during this period, the district personnel/contractor will coordinate with SCDOT Environmental Management Office to prepare an appropriate plan to minimize interference with maternal roosting. Such a plan could include temporary moratoriums that limit certain activities and/or methods to prevent roosting, such as netting or other physical barriers. The plan would also contain provisions for monitoring for maternal roosting activities, see Page 45.

14) In order to mitigate for impacts to the Waccamaw National Wildlife Refuge, as detailed on Page 59, SCDOT commits to:

    a) Construct a southbound left turn lane at the Visitors' Center access drive.
    b) Relocate and reconstruct the Visitors' Center access drive as necessary to maintain safe access.
    c) Provide appropriate payment for purchasing property to mitigate the right of way acquisition from the Refuge.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDIX A

Programmatic 4(f) Evaluation for the Waccamaw National Wildlife Refuge

FIGURES

ATTACHMENTS

APPENDIX B

Supporting Documentation and Correspondence

ENCLOSED CD

List of Items

00 Environmental Assessment
01 Natural Resource Summary
02 Noise Report
03 1-D Hydraulic Analysis Study and Floodplains Checklist
04 Conceptual Alignment Study
05 Conceptual Bridge Report
06 Highway Capacity Report
07 Cultural Resources Report
08 Hazardous Material Waste Site Assessment

I. INTRODUCTION

The South Carolina Department of Transportation (Department) proposes the replacement of the three existing US 701 bridges over Yauhannah Lake, the Great Pee Dee River, and the Great Pee Dee River Overflow located in Horry and Georgetown Counties, South Carolina. The project, as proposed, would result in certain modifications to the human and natural environment. The Department has not identified impacts that would require the preparation of an EIS. Therefore, the project meets the criteria under 23 CFR 771.115 (c) for processing as an Environmental Assessment. Specific preliminary environmental studies conducted in the early stages of project development, and also understanding of the scope of work to be performed were considered in making this decision. These studies are either appended or incorporated by reference to this document.

II. PURPOSE OF AND NEED FOR PROJECT

The US 701 Bridge Replacement project consists of the replacement and realignment of an approximately two mile long section of US 701 located in Georgetown and Horry Counties. This two-mile long section of US 701 traverses rural, undeveloped, light residential, and light commercial portions of Horry and Georgetown Counties. The project would involve replacing the three existing US 701 bridges over Yauhannah Lake, the Great Pee Dee River, and the Great Pee Dee River Overflow, as indicated on the location map, see Figure 1. The study area consists of a corridor that is approximately two miles long, 300 feet wide, and is centered on the existing US 701 alignment from a point near the US 701 / Trinity Road intersection in Georgetown County, to a point near the US 701 / Lucas Bay Road intersection in Horry County. The project involves the bridge replacements as well as the construction of a new roadway approach alignment. The project corridor crosses the referenced water bodies, as well as extensive floodplain forested wetlands. The Waccamaw National Wildlife Refuge occupies a major portion of the project corridor study area.

Purpose

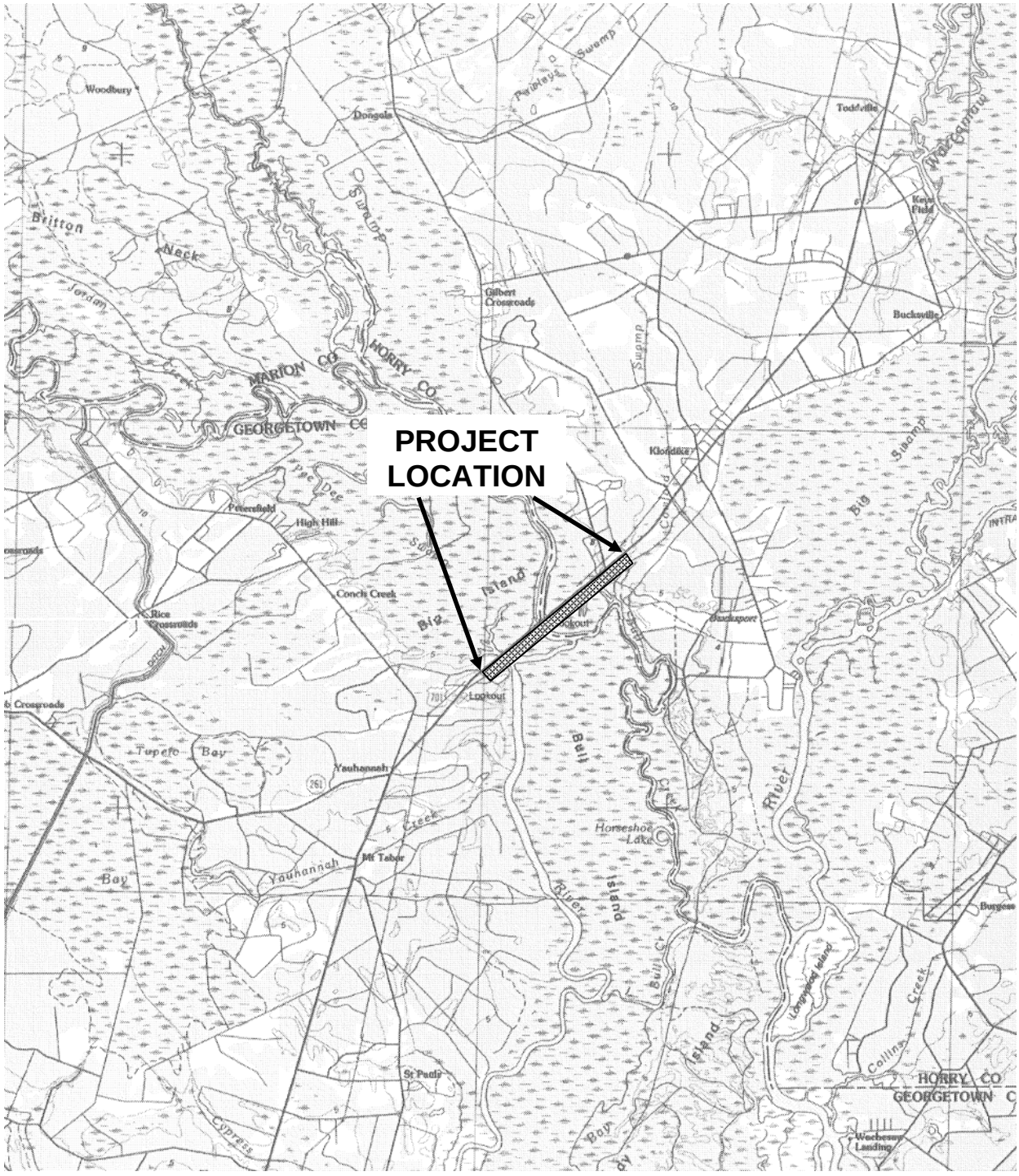
The purpose of the project is to replace the existing structurally deteriorated and functionally obsolete US 701 bridges and maintain the principal direct rural connection between the larger towns of Conway and Georgetown, as well as the smaller communities such as Bucksport and Yauhannah in between. During the construction of the replacement bridges and approaches, traffic will be maintained on the existing facilities. These existing bridges will be demolished upon completion of construction.

Need

The total cost for this entire project is estimated as $45,000,000 including all construction and right of ways costs. This project is listed in the Statewide Transportation Improvement Program (STIP) document, as revised on February 21, 2013. The existing bridges were built in the early 1950s replacing the older bridges constructed circa 1920. The existing bridges have been inspected by the Department and having been rated structurally deficient are in need of replacement for public safety reasons. It appears asphalt or other highway surfacing materials are periodically being added to the settling bridge deck at two locations causing additional settlement.

The direct US 701 route from Yauhannah to Conway is approximately 18 miles. In comparison, the most direct alternate route to Conway, via SR 261 and SR 41 to US 378, would be approximately 55 miles. Conversely, the direct US 701 route from Bucksport to Georgetown is approximately 24 miles, whereas the most direct alternate route to Georgetown would be approximately 57 miles after traveling north on US 701 from Bucksport to Conway, traveling east to US 17, and then south to Georgetown. No other significant bridging is available over the Great Pee Dee River system in this area except for the US 378 bridge, located approximately 24 miles to the northwest, or the US 17 bridge over the Waccamaw River, located approximately 21 miles to the south-southwest.

In conclusion, replacement of these three existing bridges was determined urgent by the Department and the Federal Highway Administration (FHWA) considering the physical condition of the existing structures.



Shaded Area Indicates County Location in SC

FIGURE 1: LOCATION MAP
U.S. 701 BRIDGE REPLACEMENT PROJECT
HORRY AND GEORGETOWN COUNTIES, S.C.

SCALE 0 2 MILES

N

Existing Facility

US 701 serves as the principal rural connection between the larger towns of Conway and Georgetown and is the principal north-south inland route between Georgetown and the North Carolina State line. In the area of the project corridor, the US 701 bridges over the Great Pee Dee River Overflow, the Great Pee Dee River, and Yauhannah Lake connect the smaller communities of Bucksport, in Horry County, to Yauhannah, in Georgetown County.

The existing US 701 corridor has three bridges connected by roadways on embankment fills. The bridge over Yauhannah Lake is located in Georgetown County and is 1,440 feet long. The bridge consists of 48 spans, each 30 feet long, comprised of concrete T-Beams supported on concrete bents. The bridge has a roadway width of 26 feet with a 2'-6" curb on each side. The entire bridge is on a 0% longitudinal grade. The bridge over the Great Pee Dee River is 1,603 feet long, and consists of both steel and concrete spans supported on concrete substructure units. The span lengths vary from 30 feet at the approaches on both sides of the river to 115 feet on the main river span. The bridge has a roadway width of 26 feet with a 2'-6" curb and has a 3.5% grade. The bridge over the Great Pee Dee River Overflow in Horry County is 1,320 feet long and consists of 44 spans of concrete T-Beams spanning 30 feet each, supported on concrete bents. The bridge has a roadway width of 26 feet with a 2'-6" wide curb on each side. The entire bridge is on a 0% longitudinal grade. The roadway carrying US 701 between these bridges is supported on embankments with a maximum fill height of approximately 20 feet. The roadways in the embankment areas are on 0% longitudinal grades with normal cross slopes of 2.08% from the roadway crown.

There is an existing boat landing facility on the north bank of the Great Pee Dee River in Horry County, directly upstream of the existing Great Pee Dee River Bridge. Southbound US 701 traffic can safely access the existing roads leading to the boat landing; however, it is difficult for northbound US 701 traffic to utilize this access to the boat landing. Access back onto US 701 from the boat landing facility is also difficult.

According to the U.S. Department of the Census and the Waccamaw Regional Council of Governments (COG) Demographics and Statistics, the population of Georgetown County was 63,520 in 2010. The Waccamaw COG has projected the Georgetown County population to grow by 30.1% between the years 2000 and 2030. Horry County is the largest county in South Carolina in area and the main industry in the county is tourism. The population for Horry County in 2010, as estimated by the U.S. Census and as available from the Waccamaw COG, was 242,000 and is projected to grow to 335,320 by the year 2030, with a growth of 53.4% between the years 2000 to 2030. Horry County is one of the fastest growing areas in the country; however, most of the growth appears to be located along the coast. The population of Bucksport, located just to the north of the project corridor, was estimated to be 876 in the year 2010, a decline by 21.6% in population change since 2000.

The two mile section of the US 701 corridor is very rural and is dominated by the water bodies and wooded floodplain landscape that the bridges traverse. The 2007 Georgetown County Land Use Plan categorizes the area around the project as primarily vacant. The 2008 Horry County Comprehensive Plan categorizes the Horry County area around the project as primarily rural conservation, rural residential, and institutional. Several residences and a retail gasoline station are located at the northeastern end of the corridor. Several residences and one small restaurant are located at the southwestern end of the corridor. The Waccamaw National Wildlife Refuge Visitor Center is located at the southeastern end of the corridor. The Waccamaw National Wildlife Refuge occupies much of the project corridor study area. A public boat landing is located beneath the Great Pee Dee River Bridge, on the northeastern bank of the river.

US 701 is currently a two-lane facility, consisting of one travel lane in each direction. Total existing right of way varies through the corridor. Several residential and/or accessory structures are located within the existing SCDOT right of way. The posted speed limit for the corridor is 55 miles per hour.

In general, the existing facilities are narrow, structurally deficient, and functionally inadequate for safely carrying the US 701 traffic. The proposed replacement facilities will feature a cost-effective design with appropriate considerations to the environment, safety and ease of construction.

Proposed Facility

The Department proposes to replace the three US 701 bridges over the Great Pee Dee River, Great Pee Dee River Overflow, and Yauhannah Lake in Georgetown and Horry Counties. The project would involve the realignment of an approximately two mile long section of US 701. The three new bridges would be placed on this alignment. The roadway connecting the bridges and the approach roadways on both ends of the project would be placed on embankment fills. The bridge replacement project would begin at a point near the US 701 / Lucas Bay Road intersection and continue southwest for approximately two miles to a point near the US 701 / Trinity Road intersection. The bridges will carry one travel lane in each direction that is 12 feet wide, and a shoulder in each direction of travel that is 10 feet wide. The proposed bridge deck for each of the three replacement bridges will be 47 feet wide, facilitating a 44 feet clear bridge width between the concrete barriers. Figure 2 shows the typical bridge and roadway cross sections of the proposed facility on the upstream side. The roadway section will consist of one travel lane in each direction that is 12 feet wide, and a shoulder in each direction of travel that is 10 feet wide. The 10 foot wide shoulder will have 6 feet paved and 4 feet unpaved. The project would require minor takes from several residential properties and from the Waccamaw National Wildlife Refuge. The speed limit throughout the corridor would be 55 mph. A distance of 55 feet was established as the minimum offset between the existing alignment and proposed alignment to permit the safe operation of the existing US 701 roadway during construction. Planned improvements to the Horry County boat landing access roads will permit safe utilization of the boat ramp by both northbound and southbound US 701 traffic. During the construction of the replacement bridges and approaches, traffic will be maintained on the existing facilities. The existing bridges will be demolished upon construction of the new alignment.

III. ALTERNATIVES

The Department has considered location and design alternatives in the process of developing the currently proposed "build" alternatives. The "no-build" alternative, which consists of the Department making no improvements, was considered as a baseline for comparison. Six "build" alignments, alternatives to the northwest side of the existing route, to the southeast side of the existing route, and a combination of sides have been considered as part of this study.

No-Build and Existing Alignment Alternatives

The "no-build" alternative consists of the Department making no improvements to the existing bridges and alignment. This alternative would not improve the safety or structural characteristics of the bridge / highway system. The "no-build" alternative is not considered acceptable because of the extreme cost of maintaining / rehabilitating the existing bridges in their current condition and the inconvenience to the public due to repeated lane closures and detours associated with future maintenance operations.

Replacement of the existing bridges on the existing alignment was also considered; however, this would require the road to be fully closed throughout construction, resulting in traffic detours ranging from 37 additional miles from Yauhannah to Conway to 33 additional miles from Bucksport to Georgetown. The need to maintain this principal direct rural connection between the larger towns of Conway and Georgetown, as well as the smaller communities such as Bucksport and Yauhannah in between, make this alternative considered to be not acceptable.

Feasible Alternatives

Several alternative new alignments were considered in the preliminary alignment selection process, and six feasible alternatives were considered for further development. Other alternatives were not investigated further since both the impacts and the costs were significantly higher.

Bridge Lengths

All six feasible alternatives considered for further development have the same proposed bridge lengths. The existing and proposed bridge lengths are as follows:

	Existing (ft.)	Proposed (ft.)
Bridge over Yauhannah Lake	1,440	1,453
Bridge over the Great Pee Dee River	1,603	1,770
Bridge over Great Pee Dee River Overflow	1,320	1,370

Figures 9 – 11 compare each proposed bridge length with the existing bridge length.

The six alternatives are described below.

Alternative 1

Alternative 1 involves construction in a new parallel alignment approximately 72 feet northwest (upstream) of the centerline of the existing alignment, see Figure 3. The major design issues associated with this alternative include the impact on properties along the upstream side of the north and south approaches, wetland impacts, relocation of the existing boat ramp, and utility relocations. Impacts for Alternative 1 are as follows:

No. of Residential Relocations:	3
Acreage:	2.30
No. of Residential Total Take (w/o Relocation):	1
Acreage:	0.73
No. of Residential Partial Take:	3
Acreage:	0.37
Refuge Property Take	
Acreage:	5.91
Wetland Impact – Permanent Acreage:	10.88
Wetland Impact – Temporary Acreage:	12.06

Alignment Alternative 1 involves the most residential property impacts of all build alternatives with three relocations and one total property take. The acquisition from the Refuge property is more than that of Alternative 2. Wetland impacts, both permanent and temporary, are greater than those of Alternatives 2 and 3.

Alternative 2 (Preferred Alternative)

Alternative 2 involves construction in a new parallel alignment approximately 55 feet northwest (upstream) of the centerline of the existing alignment, see Figure 4. 55 feet has been established as the minimum offset distance from the existing centerline that will permit the safe operation of the existing US 701 roadway and provide adequate space for drainage provisions during construction. The major design issues associated with this alternative include the impact on properties along the upstream side of the north and south approaches, wetland impacts, relocation of the existing boat ramp, and utility relocations. Impacts for Alternative 2 are as follows:

No. of Residential Relocations:	1
Acreage:	0.94
No. of Residential Total Take (w/o Relocation):	0
Acreage:	0.00
No. of Residential Partial Take:	7
Acreage:	1.28

Refuge Property Take	
Acreage:	4.25
Wetland Impact – Permanent Acreage:	9.47
Wetland Impact – Temporary Acreage:	11.07

Alignment Alternative 2 would require one residential property relocation. This is less than Alternative 1 and more than Alternative 3. Alignment Alternative 2 would require a total of seven partial property takes, the greatest partial takes of all build alternatives. However, the acquisition from the Refuge property would be the lowest of all build alternatives. Permanent wetland impacts are the second lowest behind Alternative 3. Temporary wetland impacts are the lowest of all build alternatives. Since Alignment Alternative 2 avoided the Cowford Lake ecosystem and avoided higher quality wetlands, the Department selected Alternative 2 as the preferred alignment. Details about the selection process are included in the 'Summary of Alternatives' subsection beginning on Page 11.

Alternative 3

Alternative 3 involves construction in a new parallel alignment approximately 55 feet southeast (downstream) of the centerline of the existing alignment, see Figure 5. Alternative 3 generally positions the new alignment along the same alignment as the original US 701 bridge constructed circa the 1920s. The major design issues associated with this alternative include the impact on properties along the downstream side of the south approach, wetland impacts, and utility relocations. Alternative 3 would not involve the relocation of the existing boat landing, but would include improvements to the boat landing access road. Impacts for Alternative 3 are as follows:

No. of Residential Relocations:	0
Acreage:	0.00
No. of Residential Total Take (w/o Relocation):	0
Acreage:	0.00
No. of Residential Partial Take:	2
Acreage:	0.20
Refuge Property Take	
Acreage:	6.55
Wetland Impact – Permanent Acreage:	8.55
Wetland Impact – Temporary Acreage:	11.45

Alignment Alternative 3 involves the third lowest impact to residential properties of all build alternatives with no relocations or total takes and small partial takes on two properties. The acquisition from the Refuge property would be the second lowest behind Alternative 2. Permanent wetland impacts are the lowest of all build alternatives. Temporary wetland impacts are the second lowest behind Alternative 2.

Alternative 4

Alternative 4 involves construction in a new parallel alignment approximately 72 feet southeast (downstream) of the centerline of the existing alignment, see Figure 6. The major design issues associated with this alternative include the impact on properties along the downstream side of the south approach, wetland impacts, and utility relocations. Alternative 4 also would not involve the relocation of the boat landing, but would include improvements to the boat landing access road. Alternative 4 would locate the alignment closer to the Waccamaw National Wildlife Visitor Center. Impacts for Alternative 4 are summarized below:

No. of Residential Relocations:	0
Acreage:	0.00
No. of Residential Total Take (w/o Relocation):	0
Acreage:	0.00
No. of Residential Partial Take:	1
Acreage:	0.13
Refuge Property Take	
Acreage:	9.99
Wetland Impact – Permanent Acreage:	10.14
Wetland Impact – Temporary Acreage:	12.35

Alignment Alternative 4 involves the second lowest impact to residential properties of all build alternatives with no relocations or total takes and a small partial take on one property. The acquisition from the Refuge property would be the third highest overall. Permanent and temporary wetland impacts are greater than those of Alternatives 1, 2 and 3.

Alternative 5

Alternative 5 involves construction in a new alignment beginning on the southeast (downstream) of the existing alignment in Georgetown County, crossing over the existing alignment, and ending on the northwest (upstream) of the existing alignment in Horry County. The new bridges over Yauhannah Lake and the Great Pee Dee River would be located southeast (downstream) of the existing bridges. The bridge over the Great Pee Dee River would be located northwest (upstream) of the existing bridge, see Figure 7. The major design issues associated with this alternative include wetland impacts, utility relocations, and maintenance of traffic/traffic closure during construction. Alternative 5 also would not involve the relocation of the boat landing, but would include improvements to the boat landing access road. Impacts for Alternative 5 are summarized as follows:

No. of Residential Relocations:	0
Acreage:	0.00

No. of Residential Total Take (w/o Relocation):	0
Acreage:	0.00
No. of Residential Partial Take:	0
Acreage:	0.00
Refuge Property Take	
Acreage:	12.02
Wetland Impact – Permanent Acreage:	10.86
Wetland Impact – Temporary Acreage:	15.69

Alignment Alternative 5 involves the lowest impact to residential properties of all build alternatives with no relocations, total takes or partial takes. The acquisition from the Refuge property would be the greatest of all the alternatives. Permanent and temporary wetland impacts are greater than those of Alternatives 2, 3 and 4 and this alternative would have the greatest temporary wetland impacts overall.

Alternative 6

Alternative 6 involves construction in a new bowed alignment approximately 132 feet northwest (upstream) of the centerline of the existing alignment, see Figure 8. The alignment was developed to be close to the wetland area previously disturbed by the construction of a power line. The major design issues associated with this alternative include the impact on properties along the upstream side of the south approach, wetland impacts, and utility relocations. Alternative 6 also would not involve the relocation of the boat landing, but would include improvements to the boat landing access road. Impacts for Alternative 6 are summarized below:

No. of Residential Relocations:	1
Acreage:	0.94
No. of Residential Total Take (w/o Relocation):	0
Acreage:	0.00
No. of Residential Partial Take:	2
Acreage:	0.02
Refuge Property Take	
Acreage:	9.71
Wetland Impact – Permanent Acreage:	15.44
Wetland Impact – Temporary Acreage:	15.08

Alignment Alternative 6 involves the third greatest impact to residential properties of all build alternatives, including one required property relocation. The acquisition from the Refuge property would be the fourth greatest overall. Permanent and temporary wetland impacts are the greatest of all build alternatives.

Summary of Alternatives

The six build alternatives consist of three upstream parallel alignments and two downstream parallel alignments, all at varying offsets to the existing alignment, and a cross-over alignment that would cross the existing alignment from downstream to upstream of the existing alignment. The construction costs for Alternatives 1 through 4 would be similar. The construction cost of Alternative 5 or Alternative 6 would be higher by as much as 20%. The following section of this EA report discusses the probable impacts of the proposed project on the various elements of the environment. An Environmental Matrix Table summarizing the impacts for each alternative is included in Table 1 at the end of this section.

The primary environmental issues associated with the evaluation of the alternatives include encroachment into the Refuge, wetland impacts and wildlife impacts. In addition, there are secondary issues involving relocation of a public boat ramp, impacts to residential properties, and some utility relocation. Alternatives 2 and 3 would result in the least environmental impacts. Alternative 2 involves construction of a new alignment approximately 55 feet northwest (upstream) of the centerline of the existing alignment. Alternative 3 involves construction of a new alignment approximately 55 feet southeast (downstream) of the centerline of the existing alignment. 55 feet has been established as the minimum offset distance from the existing centerline that will permit the safe operation of the existing US 701 roadway and provide adequate space for drainage provisions during construction. Alternative 3 would have the least wetland impact (Permanent Impact: 8.55 acres), whereas Alternative 2 would have approximately 1.0 acre more. However, Alternative 2 would require 4.25 acres of take from the Refuge, while Alternative 3 would require 2.3 acres more.

The three primary environmental issues are further discussed below.

1. Refuge

A major portion of the project corridor traverses the Waccamaw National Wildlife Refuge, which in the area of the project corridor is predominantly forested wetland. The Refuge is adjacent to US 701 on both sides of the roadway. The proposed project would encroach on the Refuge property. All alternatives studied for this project would require a take from the Refuge property. Alternative 2 would require 4.25 acres of take from the Refuge, while Alternative 3 would require 2.3 acres more (i.e., 6.55 acres). Presently, the Refuge land totals 27,000 acres. The Refuge is actively pursuing the acquisition process for expansion to over 55,000 acres.

2. Wetlands

With respect to the wetlands, Alternative 2 would result in approximately 1.0 acre greater permanent wetland impacts than Alternative 3 (the downstream alternative). However, based on a field analysis and observations conducted by biologists from the SCDOT and the US Fish and Wildlife Service on September 28, 2012 (a copy of the report is included in the Appendix B, Page B-96), the wetlands impacted by Alternative 2 are of a lesser quality due to an old road bed running along the upstream side of the bridge. This road bed has resulted in less potential biomass due to observations of lower populations of mature obligate wetland plant species in the floodplain. In addition, the

nearby regularly maintained power line right of way keeps a large swath of wetland on the upstream side in an unnatural immature palustrine emergent wetland state. This marsh-type environment has a significantly different and less diverse biotic community than the primarily palustrine forested wetland and palustrine unconsolidated bottom wetland communities on the downstream side of the existing bridge.

One method of assessing the value and function of wetlands is in terms of wildlife habitat. The U.S. Fish and Wildlife Service (USFWS) Resource Category criteria are outlined in the USFWS Mitigation Policy, 46 CFR 7644-7663. Resource categories and mitigation planning techniques are assigned based on the following criteria:

- Category 1 - Communities of one-of-a-kind high value to wildlife, unique and irreplaceable on a national or eco-regional basis, habitat is not replaceable in kind based on present-day scientific and engineering skills within a reasonable time frame.

- Category 2 - Communities of high value to wildlife, which are relatively scarce or are becoming scarce on a national, or eco-regional basis, habitat, can be replaced in kind within a reasonable time frame based on present-day scientific and engineering skills.

- Category 3 - Community types of high to medium wildlife value which are relatively abundant on a national basis, out-of-kind replacement is allowable if a tradeoff analysis demonstrates equivalency of substituted habitat type and/or habitat values. These sites are often in conjunction with a replenishing source.

- Category 4 - Community types of low to medium wildlife value, generally losses will not have a substantial adverse effect on important fish and wildlife resources. These sites have often been affected by the present roadway or human disturbances and are usually isolated.

Based on these criteria and the Department's on-site analysis, the wetlands on the upstream side best fit Category 4, except they are not isolated and the wetlands on the downstream side best fit Category 3, and with the possibility of even some Category 2 wetlands present.

In addition to general wetland protection, the habitat on the downstream side of the bridge includes the relatively unique ecosystem around Cowford Lake. Alternative 3 would result in additional clearing and access road construction which would eliminate most of the forested wetlands remaining between the bridges and Cowford Lake which currently serve as a natural filter for storm water runoff flowing into the lake. This forested wetland buffer strip provides an important wildlife corridor for both forest wildlife and wading birds including the federally endangered wood stork, which has been known to forage along the edge of Cowford Lake.

3. Wildlife

The Cowford Lake wetland complex is comprised an oxbow lake and a ridge and swale forested wetland topography which has evolved over thousands of years of river alignment adjustments. The lake has a beaver pond at its headwaters. The forested wetlands adjacent to the lake offer brood rearing habitat for wood ducks and hooded mergansers as well as foraging habitat for white ibis and wood storks.

The lake itself offers shallow water, vegetated spawning habitat for numerous freshwater fish species. Freshwater mussels can frequently be found where water flows from intersecting streams are present. The forested wetlands located between Cowford Lake and the Great Pee Dee River is the northernmost documented nest site for the Swallow-tailed Kite (*Elanoides forticatus*) which is both a state listed species and focal species for the US Fish and Wildlife Service. This nest site has been active for over 10 years and in 2009, an artificial nest structure was installed in a tree in this area as part of a larger study using artificial nesting structures to improve site selection. This structure was the only artificial structure used by kites throughout the study area in 2009.

Another state listed species has a population in the project area, the Rafinesque's big eared bat. These bats use these forested wetlands and open water areas as their primary foraging areas and often roost in hollow trees, old barns, or other structures along the river and beneath bridges.

Upon reviewing the relative impacts from the alignment alternatives on the Refuge, wetlands and wildlife as described above, Alternative 2 has been selected as the preferred alternative.

TABLE 1 : ENVIRONMENTAL MATRIX

Impact Category	Impacts by Alternative						
	"No Build" Alternative	Alternative 1 72' Upstream	Alternative 2 55' Upstream (Preferred)	Alternative 3 55' Downstream	Alternative 4 72' Downstream	Alternative 5 Downstream Upstream Crossover	Alternative 6 Upstream Bowed
Property							
Residential Relocations	0	3 (1)	**1 (1)**	0	0	0	1 (1)
Acreage	0.00 acre	2.30 acre	**0.94 acre**	0.00 acre	0.00 acre	0.00 acre	0.94 acre
Residential Total Takes (without relocations)	0	1	**0**	0	0	0	0
Acreage	0.00 acre	0.73 acre	**0.00 acre**	0.00 acre	0.00 acre	0.00 acre	0.00 acre
Residential Partial Takes	0	3	**7**	2	1	0	2
Acreage	0.00 acre	0.37 acre	**1.28 acre**	0.20 acre	0.13 acre	0.0 acre	0.02 acre
Commercial Relocations	0	0	**0**	0	0	0	0
Farmland (NRCS Rating)	N/A	147	**147**	145	145	145/147	147
Floodplains	N/A	Yes	**Yes**	Yes	Yes	Yes	Yes
Wetlands							
Permanent Impacts	0.00 acre	10.88 acre	**9.47 acre**	8.55 acre	10.14 acre	10.86 acre	15.44 acre
On Site Mitigation	0.00 acre	0.00 acre	**0.00 acre**	0.00 acre	0.00 acre	0.00 acre	-10.00 acre
Temporary Impacts	0.00 acre	12.06 acre	**11.07 acre**	11.45 acre	12.35 acre	15.69 acre	15.08 acre
Streams	N/A	None	**None**	None	None	None	None
Threatened/Endangered Species							
Federal	N/A	2 (1)	**2 (1)**	2 (1)	2 (1)	2 (1)	2 (1)
State Listed Species	N/A	1	**1**	1	1	1	1

TABLE 1: ENVIRONMENTAL MATRIX – (Continued)

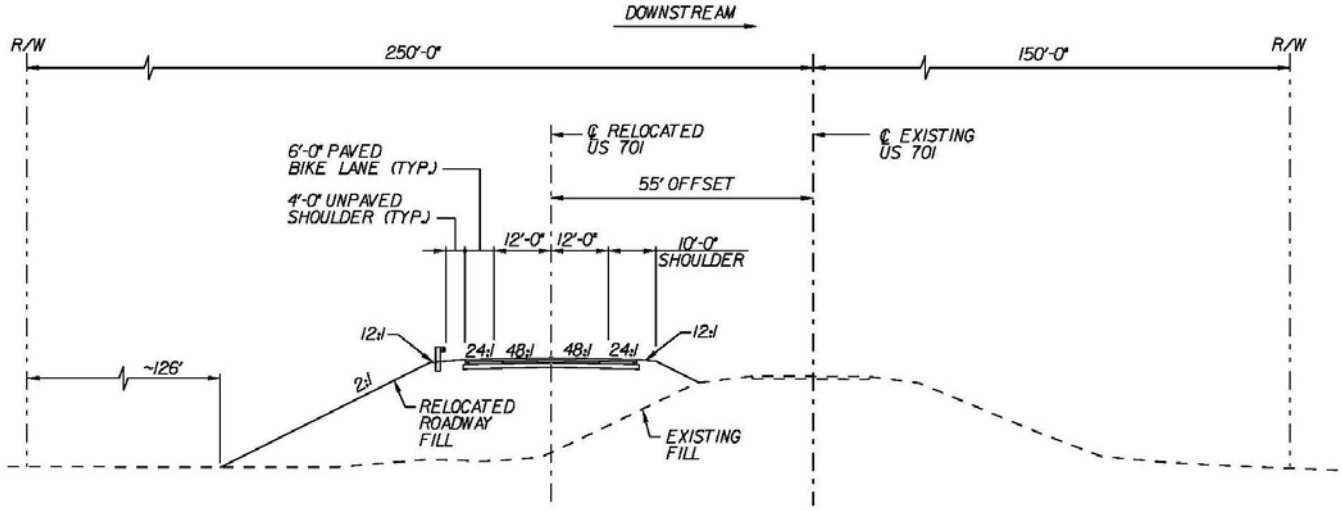
Impact Category	Impacts by Alternative						
	"No Build" Alternative	Alternative 1 72' Upstream	Alternative 2 55' Upstream (Preferred)	Alternative 3 55' Downstream	Alternative 4 72' Downstream	Alternative 5 Downstream Upstream Crossover	Alternative 6 Upstream Bowed
Noise (Receptors above the NAC)	8		**8**	6			
Cultural Resources							
Archaeological Site 38GE18	N/A	No (2)	**No (2)**	No (2)	Yes	No (2)	No (2)
Section 4(F) Resources							
Wildlife Refuge (4(f) Programmatic)	N/A	5.14 acre	**3.64 acre**	3.79 acre	6.67 acre	9.26 acre	8.99 acre
Cowford Lake Ecosystem	No	No	**No**	Yes	Yes	No	No
Horry Co. Boat Ramp (*De minimis*)	N/A	To be Relocated	**To be Relocated**	No Relocation	No Relocation	No Relocation	No Relocation
Section 6(F) Resources							
Wildlife Refuge - LWCF Funded	N/A	0.77 acre	**0.61 acre**	2.76 acre	3.32 acre	2.76 acre	0.72 acre
Hazardous Materials	N/A	1 (3)	**1 (3)**	1 (3)	1 (3)	1 (3)	1 (3)
Permits	N/A	Yes*	**Yes***	Yes*	Yes*	Yes*	Yes*

Notes: (1) – A seasonal construction moratorium will serve to protect the shortnose sturgeon (*Acipenser brevirostrum*) and the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus)* As a result of this measure, the project may affect, but is not likely to adversely affect, the shortnose sturgeon and the Atlantic sturgeon. No other federally threatened or endangered species will be affected.

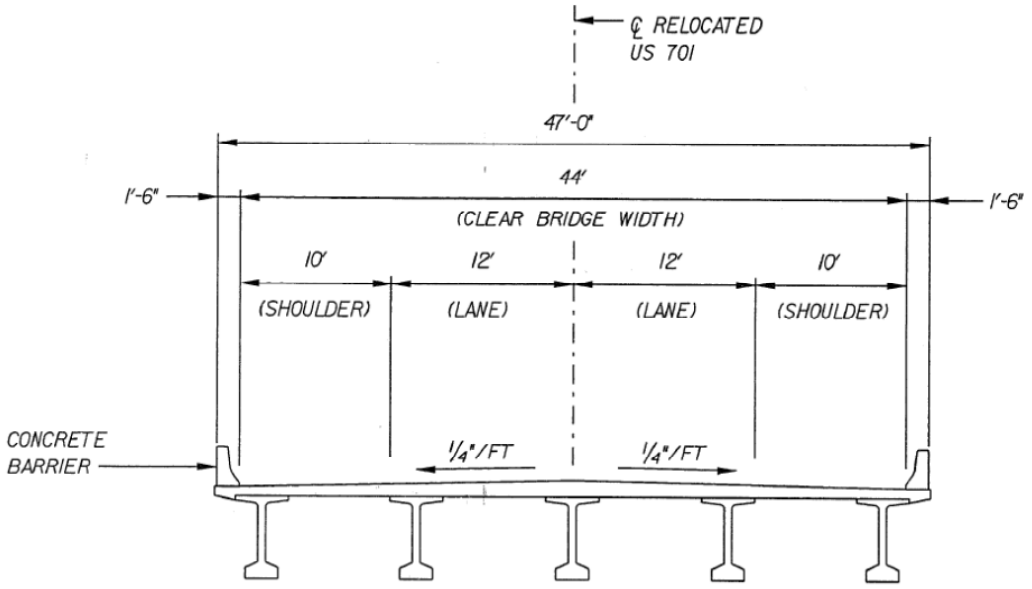
(2) – Impact is limited to previously disturbed area

(3) – Potential for encountering petroleum contaminated soil/groundwater during construction

(*) – Refer to the Permit section for list of permits required

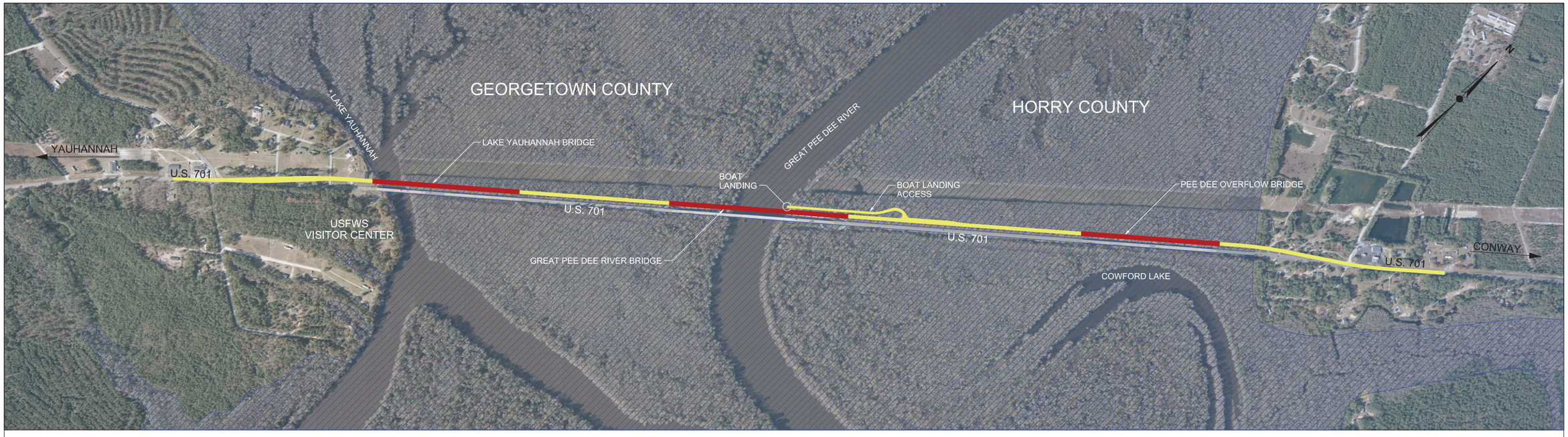


Proposed Typical Roadway Section



Proposed Typical Bridge Section

FIGURE 2 – 55' UPSTREAM SECTIONS
(PREFERRED ALTERNATIVE)



ALTERNATIVE 1 (72' OFFSET UPSTREAM)

LEGEND:

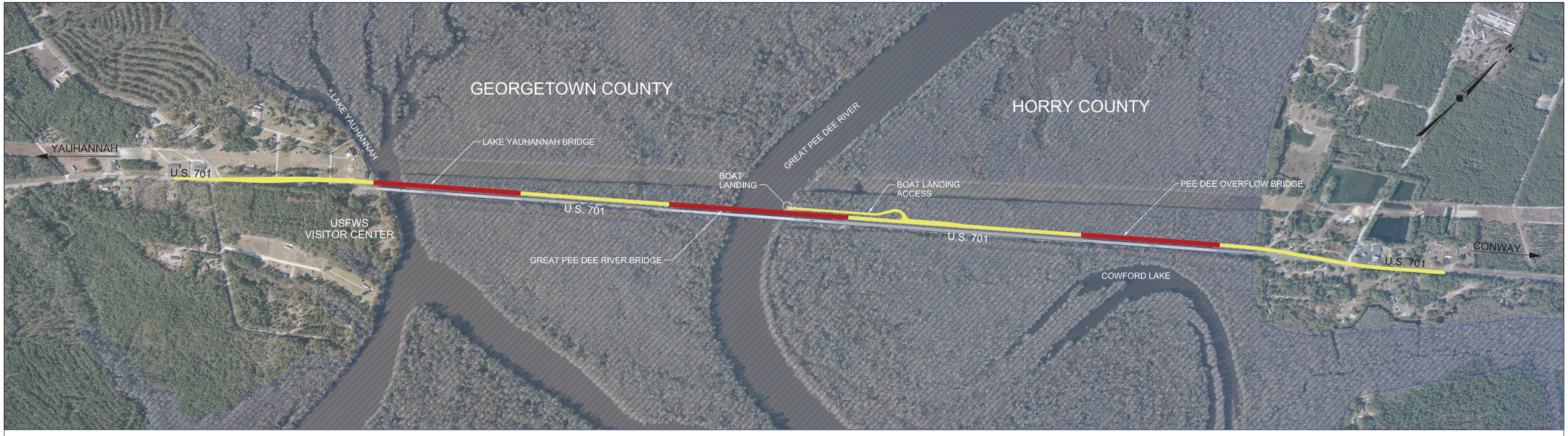
- PROPOSED ROADWAY
- PROPOSED BRIDGE
- 100 YEAR FLOOD PLAIN

FIGURE 3

TUHIN BASU & ASSOCIATES, INC.

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC



ALTERNATIVE 2 (55' OFFSET UPSTREAM)

PREFERRED ALTERNATIVE

LEGEND:

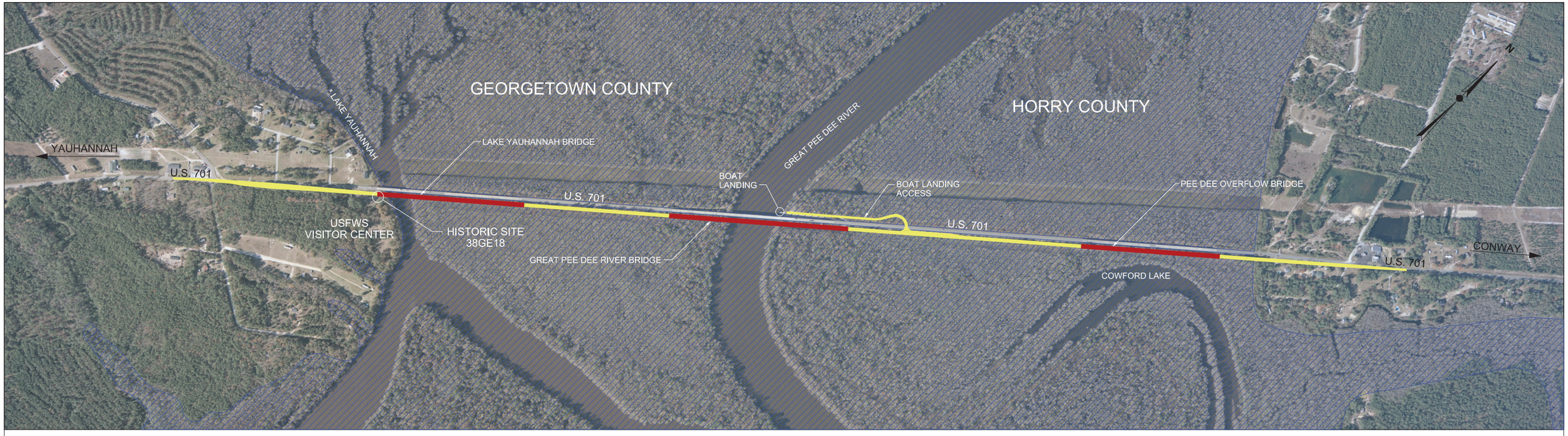
- PROPOSED ROADWAY
- PROPOSED BRIDGE
- 100 YEAR FLOOD PLAIN

FIGURE 4

TUHIN BASU & ASSOCIATES, INC.

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC



ALTERNATIVE 3 (55' OFFSET DOWNSTREAM)

LEGEND:

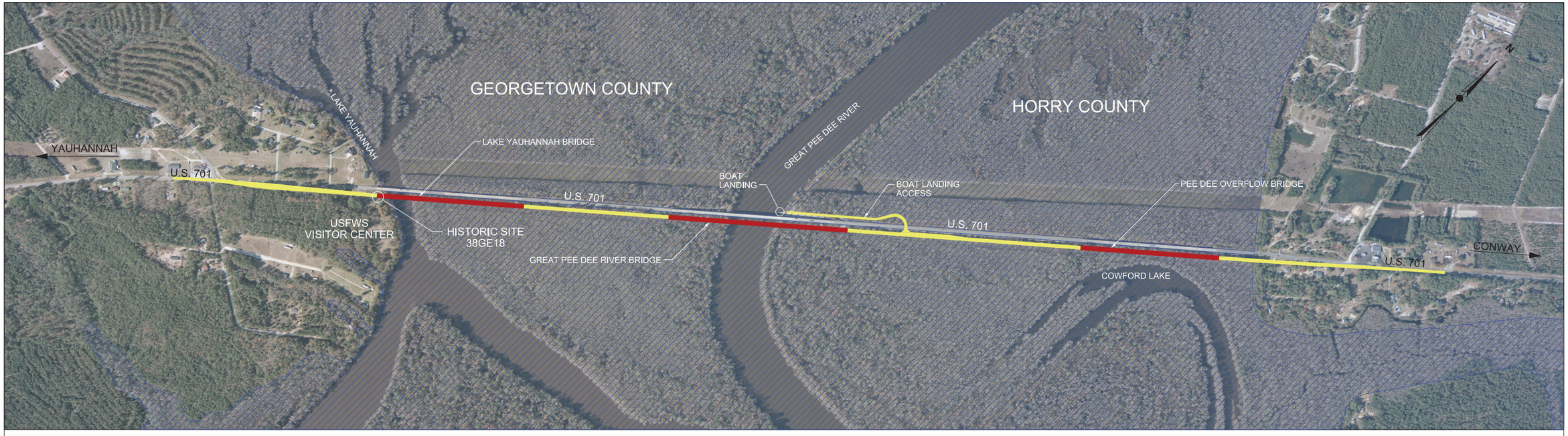
- PROPOSED ROADWAY
- PROPOSED BRIDGE
- 100 YEAR FLOOD PLAIN

FIGURE 5

TUHIN BASU & ASSOCIATES, INC.

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC



ALTERNATIVE 4 (72' OFFSET DOWNSTREAM)

LEGEND:

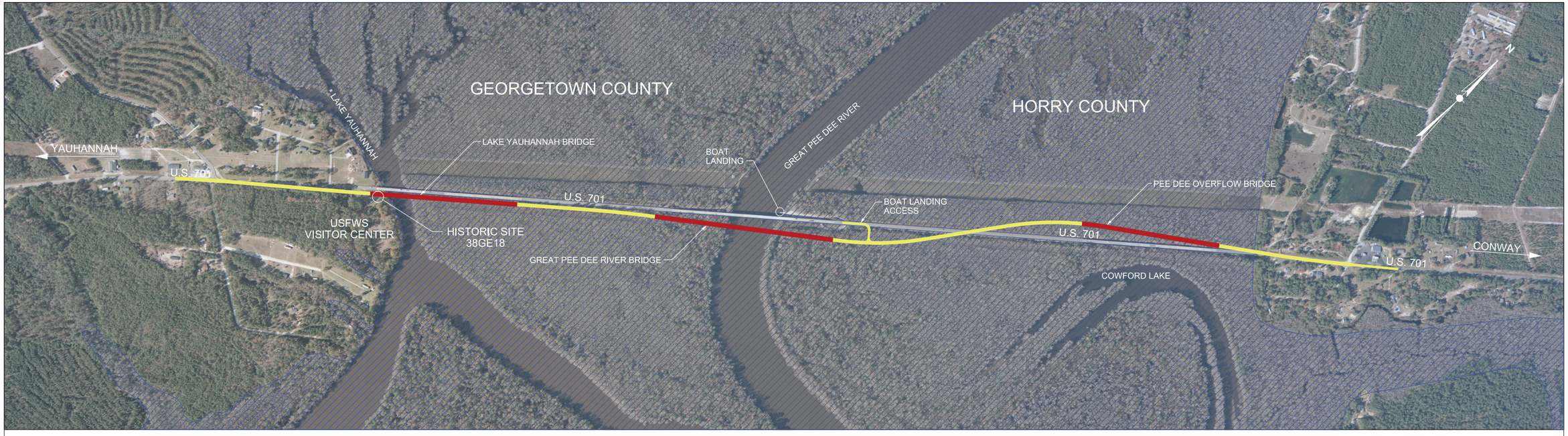
- PROPOSED ROADWAY
- PROPOSED BRIDGE
- 100 YEAR FLOOD PLAIN

FIGURE 6

TUHIN BASU & ASSOCIATES, INC.

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC



ALTERNATIVE 5 (CROSSOVER)

LEGEND:

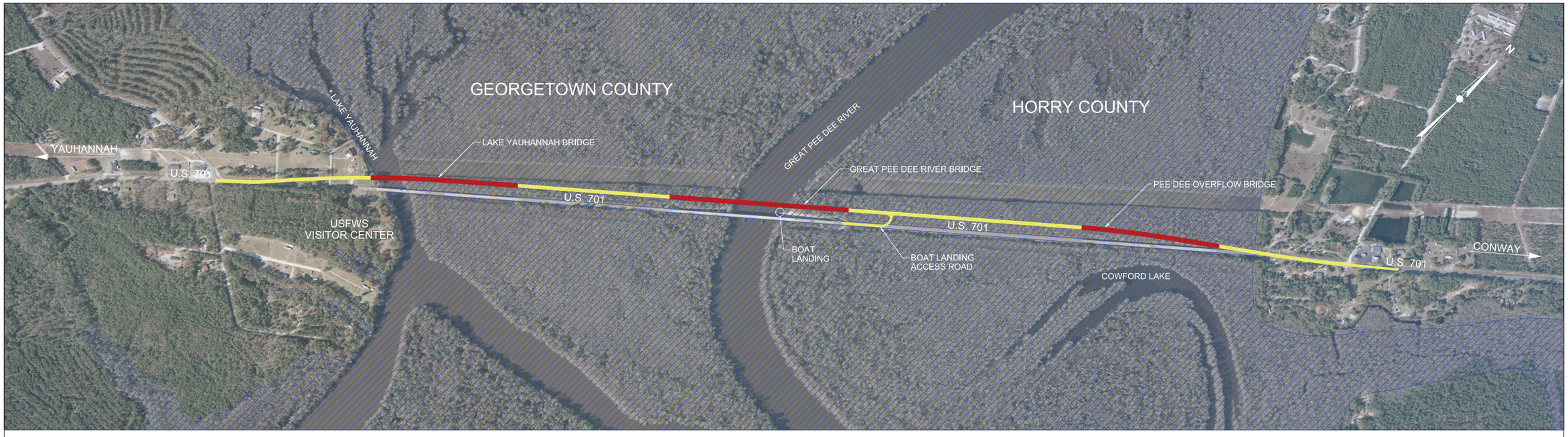
- PROPOSED ROADWAY
- PROPOSED BRIDGE
- 100 YEAR FLOOD PLAIN

FIGURE 7

TUHIN BASU & ASSOCIATES, INC.

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC



ALTERNATIVE 6 (UPSTREAM)

LEGEND:

- PROPOSED ROADWAY
- PROPOSED BRIDGE
- 100 YEAR FLOOD PLAIN

FIGURE 8

TUHIN BASU & ASSOCIATES, INC.

South Carolina Department of Transportation

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC

ALTERNATIVE 2 - LAKE YAUHANAH BRIDGE

SCALE: 1" = 200'

LEGEND:

PROPOSED ROADWAY

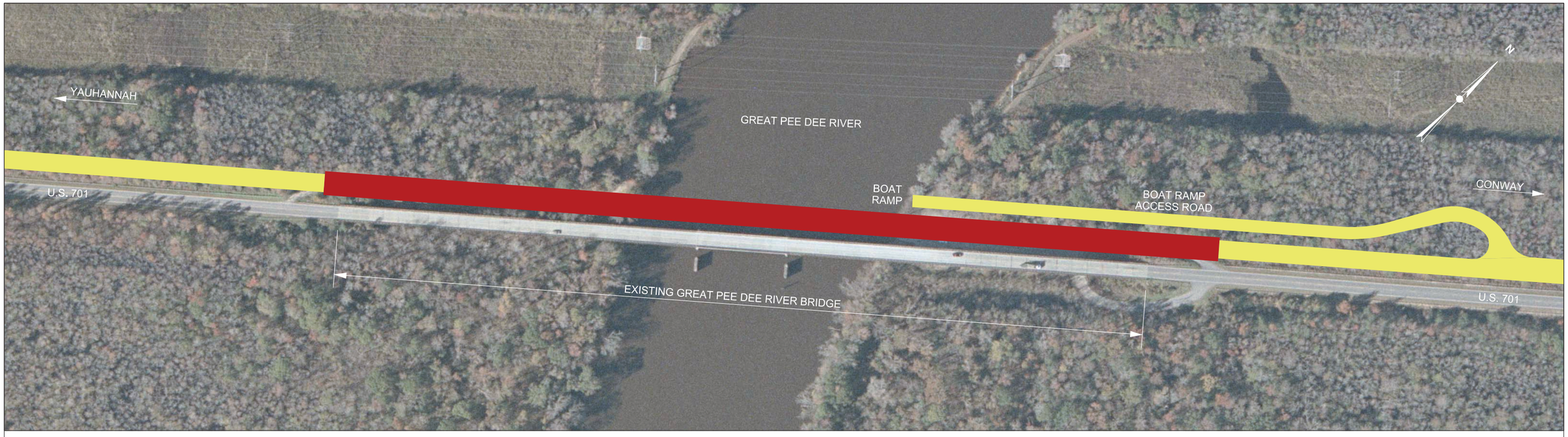
PROPOSED BRIDGE

FIGURE 9: LAKE YAUHANNAH BRIDGE LENGTH COMPARISON

TUHIN BASU & ASSOCIATES, INC.

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC



ALTERNATIVE 2 - GREAT PEE DEE RIVER BRIDGE

SCALE: 1" = 200'

LEGEND:

PROPOSED ROADWAY

PROPOSED BRIDGE

FIGURE 10: GREAT PEE DEE RIVER BRIDGE LENGTH COMPARISON

TUHIN BASU & ASSOCIATES, INC.

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC

ALTERNATIVE 2 - PEE DEE OVERFLOW BRIDGE

SCALE: 1" = 200'

LEGEND:

- PROPOSED ROADWAY
- PROPOSED BRIDGE

FIGURE 11: PEE DEE OVERFLOW BRIDGE LENGTH COMPARISON

TUHIN BASU & ASSOCIATES, INC.

REPLACMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & LAKE YAUHANNAH

HORRY/GEORGETOWN COUNTIES, SC

IV. PROBABLE IMPACTS OF THE PROJECT ON THE ENVIRONMENT

This section includes a discussion on the probable beneficial and adverse social, economic, and environmental effects of the alternatives under consideration and describes the measures proposed to mitigate any adverse impacts. This information has sufficient scientific and analytical substance to provide a basis for evaluating the merits of the project. Environmental studies conducted by the Department personnel indicate the absence of any major impacts on the human and natural environment. More in-depth discussions can be found in the appropriate environmental/technical studies for the project included in the enclosed CD. The following paragraphs provide a brief overview of the Department's environmental findings.

Land Use

The project corridor extends through a portion of Georgetown County and Horry County with their common border being the Great Pee Dee River. The two mile section of the US 701 corridor is very rural and is dominated by the water bodies and wooded floodplain landscape that the bridges traverse. Several residences and a retail gasoline station are located at the northeastern end of the corridor. Several residences and one small restaurant are located at the southwestern end of the corridor. The Waccamaw National Wildlife Refuge Visitor Center is located at the southeastern end of the corridor. The Waccamaw National Wildlife Refuge occupies a major portion of the project corridor study area. A public boat landing is located beneath the Great Pee Dee River Bridge, on the northeastern bank of the river.

On the Horry County side, most of the project corridor is zoned Commercial Forest / Agricultural (CFA). At the northeastern end of the corridor, small sections of land are zoned Residential District (MSF 10) and Highway Commercial District (HC). The residential portions of the corridor are single family residential. The future land use map for Horry County indicates US 701 to be a rural corridor through a scenic and conservation area. The Horry County future land use map does not indicate any future significant development in the planned corridor, see Figure 12. On the Georgetown County side, most of the project corridor area is zoned Conservation Preservation District (CP). The area along the northwest side of the southwest portion of the corridor is zoned Planned Development Unit (PD). The Yauhannah Bluff property is zoned Forest Agriculture District (FA). The Georgetown County future land use map indicates the area around the Great Pee Dee River and Yauhannah Lake to be conservation/preservation and the area to the southwest of this to be low density residential. The Georgetown County future land use map does not indicate any future significant development in the planned corridor, see Figure 13.

A major portion of the project corridor traverses the Waccamaw National Wildlife Refuge, which in the area of the corridor, is predominantly forested wetland. The Refuge is adjacent to US 701 on both sides of the roadway. In 1997, a Final Environmental Impact Statement (FEIS) was prepared for the proposed establishment of the Waccamaw National Wildlife Refuge by the U.S. Fish and Wildlife Service (USFWS). USFWS proposed to establish the refuge in the vicinity of the Great Pee Dee and Waccamaw Rivers in Georgetown, Horry and Marion Counties, South Carolina. The purposes of the proposed refuge would be to (1) protect and manage diverse habitat components within an important coastal river ecosystem for the benefit of endangered

and threatened species, freshwater and anadromous fish, migratory birds, and forest wildlife, including a wide array of plants and animals associated with bottomland hardwood habitats; and, (2) provide compatible wildlife-dependent recreational activities including hunting, fishing, wildlife observation, photography, and environmental education and interpretation for the enjoyment of present and future generations[1]. The proposal was developed by the USFWS in coordination with the State of South Carolina and other Federal agencies. Future improvements and widening of the existing US 701 within the proposed refuge was recognized in the FEIS. Presently, the refuge land totals approximately 27,000 acres. The refuge is actively pursuing the acquisition process for expansion to over 55,000 acres[2].

Subsequent to the establishment of the Waccamaw National Wildlife Refuge, the USFWS acquired the 22 acre Yauhannah Bluff property located in Georgetown County near the southern end of US 701 bridge replacement project. The bluff property became the planned location for the refuge visitor center. During the planning process, USFWS and SCDOT communicated about the future improvements and widening of US 701 prior to locating the Visitor Center. Construction of the Visitor Center located on the downstream side of US 701 was completed in 2009.

The current activities at the refuge include boating, canoeing, and kayaking in the rivers and creeks; wildlife observation and photography; hiking along the Great Pee Dee River and Bull Creek in the vicinity of the existing US 701 bridge just north of Yauhannah Lake; and freshwater fishing, hunting, and environmental education activities.

The proposed project is consistent with current land uses in the area. The existing two-lane bridges and roadways will be replaced by new two-lane bridges and roadways adding no additional travel lanes or medians. After the project is completed, the corridor would look similar in character and nature as it does today. The project is not expected to adversely impact development potential in the area.

[1] United States Department of the Interior, Fish and Wildlife Service, Southeast Region, "Final Environmental Impact Statement, Proposed Establishment of Waccamaw National Wildlife Refuge", Volume I, April 1997.

[2] http://www.fws.gov/waccamaw

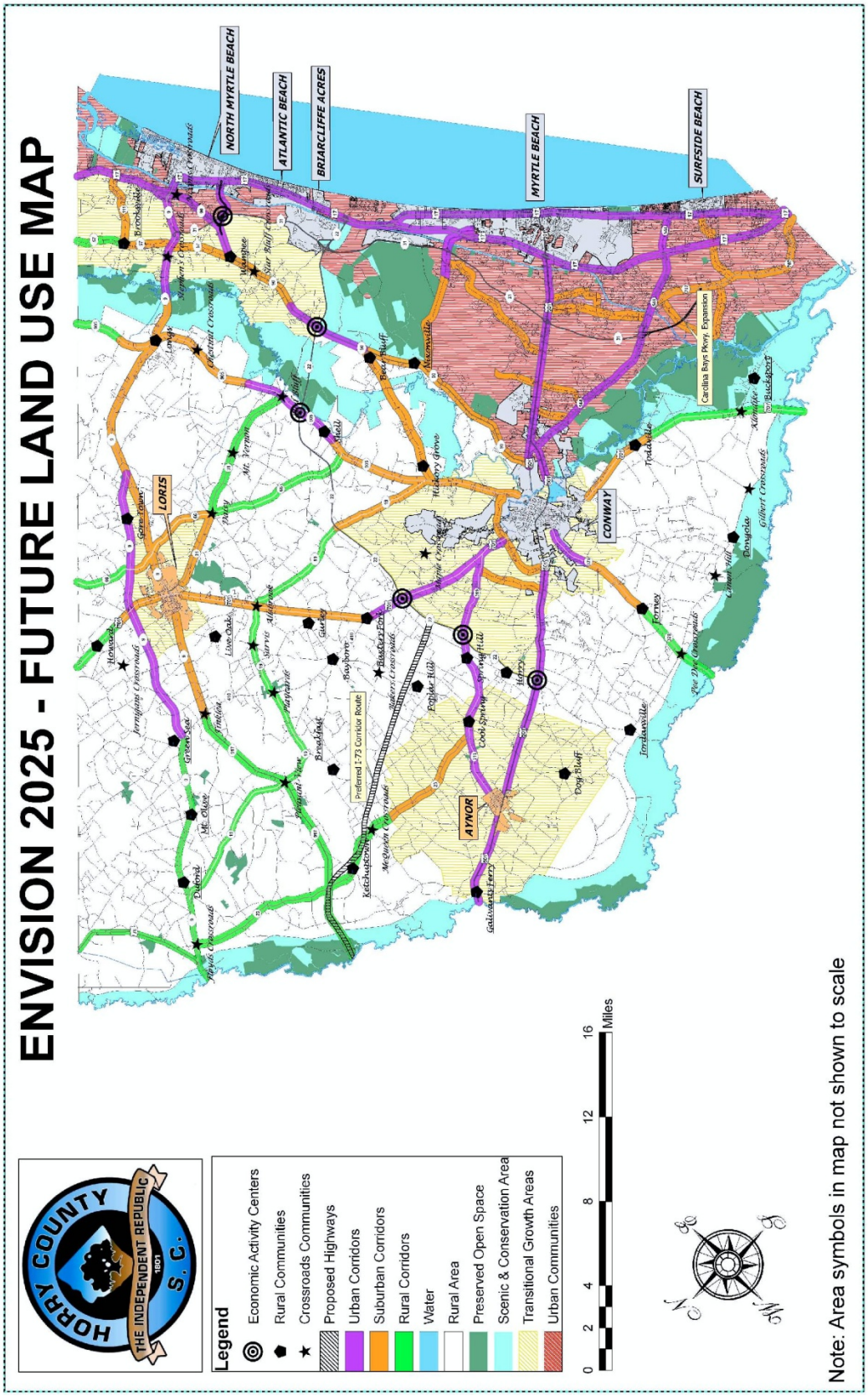


FIGURE 12: HORRY COUNTY FUTURE LAND USE MAP

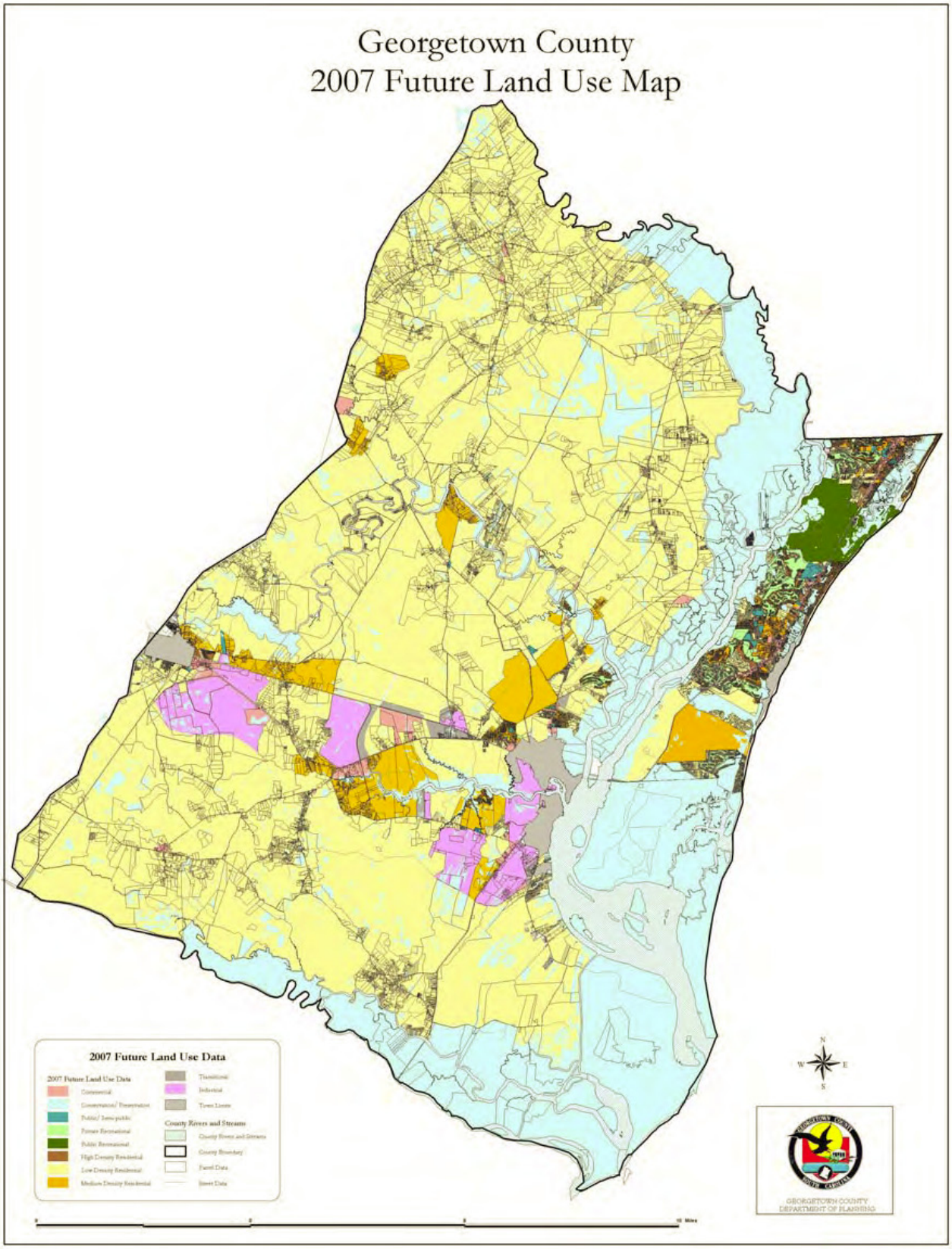


FIGURE 13: GEORGETOWN COUNTY FUTURE LAND USE MAP

Threatened or Endangered Species

Pursuant to Section 7 of the Endangered Species Act of 1973, a field survey of the proposed new right of way was conducted. The following lists of endangered (E) and threatened (T) species for Horry and Georgetown Counties were obtained from the U.S. Fish and Wildlife Service (USFWS):

Horry and Georgetown Counties

Animals
Blue whale – *Balaenoptera musculus (E)*
Finback whale - *Balaenoptera physalus (E)*
Humpback whale – *Megaptera novaeangliae (E)*
North Atlantic right whale – *Eubalaena glacialis (E)*
Sei whale – *Balaenoptera borealis (E)*
Sperm whale – *Physeter macrocephalus (E)*
Green sea turtle – *Chelonia mydas (T)*
Hawksbill sea turtle – *Eretmochelys imbricate (E)*
Kemp's ridley sea turtle – *Lepidochelys kempii (E)*
Leatherback sea turtle – *Dermochelys coriacea (E)*
Loggerhead sea turtle – *Caretta caretta (T)*
West Indian manatee – *Trichechus manatus (E)*
Shortnose sturgeon – *Acipenser brevirostrum (E)*
Atlantic sturgeon - *Acipenser oxyrinchus oxyrinchus (E)*
Bald eagle – *Haliaeetus leucocephalus* (*BGEPA*)) *
Red-cockaded woodpecker – *Picoides borealis* (*E*)
Wood stork – *Mycteria americana (E)*
Piping plover – *Charadrius melodus (T)*
Kirtland's warbler – *Dendroica kirtlandii (E)*

**The Bald Eagle is no longer considered threatened under the ESA; however, protection is afforded to this species under the Bald and Golden Eagle Protection Act (BGEPA).*

Plants
Sea-beach amaranth – *Amaranthus pumilus (T)*
Pondberry – *Lindera melissifolia (E)*
Canby's dropwort – *Oxypolis canbyi (E)*
American chaffseed – *Schwalbea americana (E)*

A review of the project corridor was conducted by the Department's biologist in January, March and June of 2005 in order to identify the presence of any species from the list provided by the USFWS. The information collected has been compiled into one general Biological Assessment Report, see the Appendix B, Page B-2. The area surveyed consists of a corridor that is approximately two miles long, 300 feet wide, and is centered on the existing US 701 alignment from a point near the US 701 / Lucas Bay Road intersection, to a point near the US 701 / Trinity Road intersection.

None of the listed species were observed during field surveys. It is known that the sturgeon does exist in the Great Pee Dee River. The Department has agreed to

implement a seasonal moratorium for all in water work between January 1 and April 15. In-water work is defined as any activity (e.g. excavation, fill, pile driving, drilled shaft construction) that could result in the physical destruction or alteration of important spawning habitats. During the moratorium, the contractor would be allowed to work from a barge in order to construct columns, caps, and bridge superstructure. The contractor would be allowed to move barges between shafts during the moratorium; however, barges must be secured by cables as placement of spuds to secure barges will not be allowed during the moratorium. Equipment and materials used during the construction of the bridge will not obstruct or impede passage through more than 50 percent of the channel. This restriction will allow the migratory pathway to remain open while both shortnose sturgeon and Atlantic sturgeon are likely to be migrating.

As a result of implementing these measures, the project may affect, but is not likely to adversely affect the endangered shortnose sturgeon and the Atlantic sturgeon. A separate Biological Assessment for the shortnose sturgeon was prepared for submittal to NOAA Fisheries. Upon request from NOAA Fisheries the Department submitted supplemental information in August 2009. On October 1, 2009 the Department submitted a letter to NOAA Fisheries containing descriptions of anticipated procedures for constructing the replacement bridges and demolition of the existing structures. By a letter dated October 29, 2009 NOAA Fisheries concurred with the SCDOT's proposed implementation of a seasonal moratorium for all in water construction work during the spawning season. A copy of this letter is included in Appendix B, Page B-32. Effective April 6, 2012 the NOAA Fisheries issued a final determination to list two distinct population segments (DPSs) of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) as endangered under the Endangered Species Act (ESA) of 1973, as amended. On September 19, 2012 the SCDOT submitted a letter to the NOAA Fisheries requesting an informal consultation regarding the effect of the proposed action related to this project on the Atlantic sturgeon. NOAA Fisheries responded via e-mail on October 18, 2012 stating that there was no need to re-initiate the consultation process for Atlantic sturgeon. NOAA Fisheries stated that the SCDOT's proposed conservation measures for shortnose sturgeon and the effects analysis (i.e., may affect, but not likely to adversely affect) would be applicable to Atlantic sturgeon as well. A copy of the October 18, 2012 email is included in the Appendix B, Page B-40. The Department determined that the proposed project will have no effect upon species currently protected under the Endangered Species Act. The USFWS concurred with this determination by a signed letter dated on August 23, 2010. A copy of that concurrence letter is included in the Appendix B, Page B-94.

Farmlands

The Farmland Protection Policy Act of 1981 requires evaluation of farmland conversions to nonagricultural uses. Farmland can be prime farmland, unique farmland, or farmland of statewide or local importance. Prime farmland soils are those that have characteristics favorable for economic production of sustained high yields of crops. These soils may or may not be presently used as cropland. Conversely, land that is presently used as cropland may or may not be prime farmland.

Through the use of county farmland listings provided by the Natural Resources Conservation Service (NRCS), it has been determined that the project area would involve lands protected under the Act. A Farmland Conversion Impact Rating Form SCS-CPA-160 has been completed for the project corridor. The form provides a site

assessment scoring system with criteria for evaluating adverse effects of projects on the protection of farmland. Sites receiving highest scores up to a maximum of 260 are considered most suitable for protection while those with lowest scores are considered least suitable. Sites receiving scores less than the maximum allowable score of 160 are to be given minimal consideration for protection. The score computed for this proposed action was 145, assuming a relative soil value of 100. As the total points are less than 160, neither consideration of alternative sites nor additional studies for the study area are required under the Act. For a copy of this agreement between the SCDOT and NRCS and the Farmland Conversion Impact Rating Form, see the Appendix B, beginning on Page B-42.

Water Quality

The project will involve work within the Great Pee Dee River, Yauhannah Lake, and the forested wetlands associated with these water bodies, as well as the wetlands associated with the Great Pee Dee River Overflow. Water quality Information gathered during the research portion of this project is further described in the Natural Resources Summary Report in the enclosed CD, and is summarized below. During construction activities, temporary siltation may occur in these water bodies and erosion will be of a greater degree than presently occurring on existing terrain. The contractor would be required to minimize this impact through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and S.C. Code of Regulations 72-400. The SCDOT has issued an Engineering Directive Memorandum (Number 23), dated March 10, 2009, regarding Department procedures to be followed in order to ensure compliance with S.C. Code of Regulations 72-400, Standards for Stormwater Management and Sediment Reduction. Exposed areas may be stabilized by following the Department's Supplemental Technical Specification for Seeding SCDOT Designation SC-M-810 (11/08).

As erosion control methods necessary to curtail runoff will be employed during construction, it has been determined that there should be no substantial impact on water quality in the area as a result of this project.

At the time of the 2005 data collection for this project, information for this portion of the Great Pee Dee River watershed was collected from the SCDHEC Bureau of Water website. At that time this portion of the Great Pee Dee River was included in SCDHEC hydrologic unit #03040201-170, which included primarily the Pee Dee River and its tributaries from the Little Pee Dee River to Winyah Bay. Since that time a re-designation by SCDHEC has incorporated a larger regional watershed, designated the Great Pee Dee River / Winyah Bay watershed. This watershed unit is now designated #03040207-02 and was formerly #s 03040201-170, 03040201-160, and a portion of 03040207-040.

At the US 701 Bridge crossing, the water has a classification of FW (Freshwater), which is defined as freshwater suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with SCDHEC requirements. These waters are suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora (SCDHEC definition of "FW").

The Great Pee Dee River above the US 701 bridge is listed by SCDHEC as a State impaired water for purposes of fish consumption due to mercury contamination

under Section 303(d) of the Clean Water Act (2004 and 2008 listing). At the time of the 2005 research, the SCDHEC water shed data for what was then hydrologic unit #03040201-170 also indicated that aquatic life uses are not supported in the Great Pee Dee River at the US 701 bridge due to occurrences of zinc in excess of the aquatic life acute standards. However, the recent data, for what is now unit #03040207-02, shows that aquatic life uses are fully supported (SCDHEC Water Quality Standards and Water Shed Planning Section; SCDHEC Bureau of Water, 2005/2009). Recreational uses are fully supported.

Impacts from the project could include increased sedimentation and siltation, changes in light incidence and water clarity due to increased sedimentation and vegetation removal, increased nutrient loading during construction via runoff from exposed areas, increased concentrations of toxic compounds in roadway runoff, and increased potential for release of fuels and oils from construction equipment and other vehicles. However, BMPs, erosion control methods, and the use of SCDOT designated seeding techniques will be used to minimize such effects. The 303(d) listing is due to mercury contamination, which is primarily associated with deposition from the atmosphere, mainly through rainfall, with the primary sources being coal fired power plant and chemical plants, and not typically through vehicle related road runoff.

Long term impacts to water bodies will be limited to the area of the road facility footprint only. Due to the current design standards, the roadway and bridges will be slightly wider and longer than the existing roadway and bridges. However, as the purpose of the project is the replacement of the existing two-lane roadway and bridge facility, with another two-lane facility, traffic capacity is not expected to increase over the "no build" alternative. Runoff may be increased due to the proposed wider roadway, but vehicle related contaminants in the runoff should not increase due to the proposed wider roadway having the same number of traffic lanes as existing. The deck drainage system will consist of scuppers and downspouts. However, the deck runoff over the width of the Great Pee Dee River will be collected; and, unlike the existing bridge deck drainage, the runoff will not be directly discharged into the Great Pee Dee River. Again, through the use of required BMPs, erosion control methods necessary to curtail runoff during construction, the use of SCDOT designated seeding techniques, and the fact that vehicle traffic should not significantly increase above the "no build" alternative, it has been determined that there should be no substantially increased impact on water quality in the area as a result of this project.

The proposed project will require Clean Water Act Section 401 Water Quality Certification. Water quality standards are an effective tool available to States to protect the overall health of their wetlands resources and the valuable functions they provide including shoreline stabilization, nonpoint source runoff filtration, wildlife habitat, and erosion control, which directly benefit adjacent and downstream waters. The South Carolina Department of Health and Environmental Control (SCDHEC) administers the Water Quality Certification program, pursuant to Section 401 of the Federal Water Pollution Control Act of 1972 as amended by the Clean Water Act of 1977 and the Water Quality Act of 1987 will be required for the proposed project. Certification is required for activities permitted by the USACE for construction occurring in navigable waters or discharge of dredged or fill material into the State's waters. This certification assures the project would comply with state water quality standards.

Wetlands

Wetland habitats are defined as those areas that are inundated by water with sufficient frequency and duration to support vegetation that is tolerant of saturated soil conditions. The U.S. Army Corps of Engineers (USACE) utilizes specific hydrologic, soil, and vegetation criteria in establishing the boundary of wetlands within their jurisdiction.

As mentioned earlier in the Summary of Alternatives (Section III), one method of assessing the value and function of wetlands is in terms of wildlife habitat. The U.S. Fish and Wildlife Service (USFWS) Resource Category criteria are outlined in the USFWS Mitigation Policy, 46 CFR 7644-7663. Resource categories and mitigation planning techniques are assigned based on the following criteria:

- Category 1 - Communities of one-of-a-kind high value to wildlife, unique and irreplaceable on a national or eco-regional basis, habitat is not replaceable in kind based on present-day scientific and engineering skills within a reasonable time frame.

- Category 2 - Communities of high value to wildlife, which are relatively scarce or are becoming scarce on a national, or eco-regional basis, habitat, can be replaced in kind within a reasonable time frame based on present-day scientific and engineering skills.

- Category 3 - Community types of high to medium wildlife value which are relatively abundant on a national basis, out-of-kind replacement is allowable if a tradeoff analysis demonstrates equivalency of substituted habitat type and/or habitat values. These sites are often in conjunction with a replenishing source.

- Category 4 - Community types of low to medium wildlife value, generally losses will not have a substantial adverse effect on important fish and wildlife resources. These sites have often been affected by the present roadway or human disturbances and are usually isolated.

A combination of a review of available map and aerial photograph information, vegetation analysis, hydrological observations, and soil sampling (to verify soil types as mapped by the soil surveys) was utilized to determine the locations of wetlands within the proposed US 701 Bridge Replacement project area. As replacement of the bridge and roadway system will traverse these wetlands, wetland impacts are unavoidable. The alignment will also cross, via bridging, Yauhannah Lake, the Great Pee Dee River, and Great Pee Dee River Overflow. Wetlands were given special consideration during development and evaluation of the project. Measures were considered and implemented to avoid and minimize impacts to wetlands. An evaluation of conceptual alternative alignments has been used in order to minimize the wetland impacts. Other measures as described later in this section, including 2:1 embankment fill slopes and best management practices, will also be used to minimize the unavoidable wetland impacts. The wetlands impacted are considered to be palustrine forested floodplain wetland.

The wetland impacts for Alternatives 1 through 6 are described below.

Alternative 1

Alternative 1 involves construction in a parallel alignment approximately 72 feet northwest (upstream) of the centerline of the existing alignment. Approximately 10.88 acres of wetlands would be permanently impacted for this alternative and an additional 12.06 acres of wetlands would be temporarily impacted during construction. Alternative 1 has the greatest permanent wetland impacts of the four parallel alignments and the second greatest of all six build alignments.

Alternative 2

Alternative 2 involves construction in a parallel alignment approximately 55 feet northwest (upstream) of the centerline of the existing alignment. Approximately 9.47 acres of wetlands would be permanently impacted for this alternative and an additional 11.07 acres of wetlands would be temporarily impacted during construction. Alternative 2 has the second lowest permanent wetland impacts behind Alternative 3, and the lowest temporary wetland impacts of the six build alternatives.

Alternative 3

Alternative 3 involves construction in a parallel alignment approximately 55 feet southeast (downstream) of the centerline of the existing alignment. Alternative 3 generally positions the new alignment along the same alignment as the original US 701 bridge constructed circa 1920s. Approximately 8.55 acres of wetlands would be permanently impacted for this alternative and an additional 11.45 acres of wetlands would be temporarily impacted during construction. Alternative 3 has the lowest permanent wetland impacts and the second lowest temporary wetland impacts of the six build alternatives.

Alternative 4

Alternative 4 involves construction in a parallel alignment approximately 72 feet southeast (downstream) of the centerline of the existing alignment. Alternative 4 would position the new alignment closer to Cowford Lake than Alternative 3. Approximately 10.14 acres of wetlands would be permanently impacted for this alternative and an additional 12.35 acres of wetlands would be temporarily impacted during construction. Permanent and temporary wetland impacts are greater than those of Alternatives 1, 2 and 3.

Alternative 5

Alternative 5 involves construction in a new crisscross alignment beginning southeast (downstream) of the existing alignment in Georgetown County, bridging over Yauhannah Lake and the Great Pee Dee River, then crossing over the existing alignment northeast of the boat landing, and continuing upstream (northwest) of the existing alignment. Approximately 10.86 acres of wetlands would be permanently impacted for this alternative and an additional 15.69 acres of wetlands would be temporarily impacted during construction. Alternative 5 has the greatest temporary

wetland impacts of the six build alternatives and the third highest permanent wetland impacts overall.

Alternative 6

Alternative 6 involves construction in a new bowed alignment approximately 132 feet northwest (upstream) of the centerline of the existing alignment. Approximately 15.44 acres of wetlands would be permanently impacted for this alternative and an additional 15.08 acres of wetlands would be temporarily impacted during construction. Alternative 6 has the highest permanent wetland impacts of the six build alternatives and the second highest temporary wetland impacts.

Preferred Alternative

Based on the USFWS Resource Category criteria described earlier and the Department's on-site analysis, the wetlands on the upstream side of the existing US 701 alignment best fit Category 4, except they are not isolated, and the wetlands on the downstream side best fit Category 3 , and with the possibility of even some Category 2 wetlands present. Alternative 3 would result in the minimum permanent wetland impacts of all build alternatives. Alternative 2 would result in approximately 1.0 acre greater permanent wetland impacts than Alternative 3 (the downstream alternative). However, based on a field analysis and observations conducted by biologists from the SCDOT and the US Fish and Wildlife Service (See signed report in the Appendix B, Page B-96), the wetlands impacted by Alternative 2 are of a lesser quality due to an old road bed running along the upstream side of the bridge. This road bed has resulted in less potential biomass due to observations of lower populations of mature obligate wetland plant species in the floodplain. In addition, the nearby regularly maintained power line right of way keeps a large swath of wetland on the upstream side in an unnatural immature palustrine emergent wetland state. This marsh-type environment has a significantly different and less diverse biotic community than the primarily palustrine forested wetland and palustrine unconsolidated bottom wetland communities on the downstream side of the existing bridge.

In addition to general wetland protection, the habitat on the downstream side of the bridge includes the relatively unique ecosystem around Cowford Lake. Alternative 3 would result in additional clearing and access road construction which would eliminate most of the forested wetlands remaining between the bridges and Cowford Lake which currently serve as a natural filter for storm water runoff flowing into the lake. This forested wetland buffer strip provides an important wildlife corridor for both forest wildlife and wading birds including the federally endangered wood stork, which has been known to forage along the edge of Cowford Lake.

As a result of the abovementioned analyses and considerations, Alternative 2 has been selected as the preferred alternative.

Minimization & Mitigation of Impacts

As there are no practicable alternatives to the proposed new construction in these wetland areas, the proposed action will include all practicable measures to minimize harm to wetlands that may result from construction. In addition, the Department will comply with Executive Order 11990 regarding protection of wetlands by

continuing to minimize impacts as the design becomes more complete. The wetlands located in the project corridor serve a significant floodplain function, as well as provide significant bottomland habitat for a variety of wildlife. The floodplain/wetland habitat of the Great Pee Dee River system in this area has been partially fragmented due to the construction of the original US 701 causeway. However, based on a review of available aerial photography and field observations, the transmission line right of way and the existing causeways for US 701 represent the only significant breaks in this wetland habitat for miles upstream and downstream from US 701 (See Natural Resources Summary Report in the enclosed CD). The project will utilize 2:1 embankment fill slopes and will also utilize to the extent practicable the existing causeway fill to minimize the taking of wetland throughout the project. Implementing erosion control measures, which include seeding of slopes, hay bale emplacement, silt fences, and sediment basins as appropriate, would also minimize impact on adjacent wetlands. Other best management practices would be required of the contractor to ensure compliance with policies reflected in 23 CFR 650B. Reclamation of wetland areas temporarily lost through construction activities will involve returning disturbed areas to their original elevations to the extent practicable, allowing for adjacent vegetation to naturally reclaim the area.

Compensatory mitigation is the third step in a sequence of actions that must be followed to offset impacts to aquatic resources. The 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the Department of the Army established a three-step process (Step 1 – Avoid, Step 2 – Minimize, and Step 3 – Compensate), known as the mitigation sequence to help guide mitigation decisions and determine the type and level of mitigation required under Clean Water Act Section 404 regulations. The objective of the Clean Water Act (CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's Waters. Toward achievement of this goal, the CWA prohibits the discharge of fill material into waters of the United Sates unless a permit issued by the Army Corps of Engineers authorizes such a discharge. For every authorized discharge, the adverse impacts to wetlands, streams and other aquatic resources typically require compensatory mitigation, including on-site and off-site permitee-responsible mitigation, mitigation banks, and in-lieu fee mitigation. The Army Corps of Engineers is responsible for determining the appropriate form and amount of compensatory mitigation required. SCDOT, in coordination with USFWS, plans to locate and acquire an appropriate property that will generate the compensatory mitigation credits required to compensate for unavoidable impacts associated with the proposed bridge replacements.

The proposed project will require an individual Corps of Engineers Section 404 permit. The Clean Water Act (Section 404) requires a permit for placing dredge or fill material in waters of the United States or the wetlands under the authority of the United States Army Corps of Engineers (USACE). Wetland extent within the study area is shown in Figures 14 & 15. The "Request for Wetland Determination" package has been submitted to the U.S. Army Corps of Engineers, Charleston District, and approval of the Jurisdictional Determination was provided on January 7, 2010. A copy of this letter is located in the Appendix B, Page B-55.

[3] 40 CFR Part 230 Subpart J and 33 CFR Part 332 Compensatory Mitigation for Losses of Aquatic Resources

Invasive Species Management

Invasive plant species are those that have been introduced into an environment in which they did not evolve; and, therefore have no natural enemies to limit their reproduction and spread. Many of these species are considered noxious weeds and even some native plants can be considered invasive species. Transportation projects result in the disturbance of vegetated areas, which can allow invasive plant species to overtake an area when re-vegetation occurs. However, Best Management Practices (BMPs) are used to reduce the introduction or spread of invasive species.

In 1999, a Presidential Executive Order on Invasive Species (EO 13112) was issued to direct all federal agencies to address invasive species concerns and refrain from actions likely to increase invasive species problems. This order also directs agencies to "provide for restoration of native species and habitat conditions in ecosystems that have been invaded."

SCDOT will comply with the intent of EO 13112 regarding Invasive Species by formulating a plan to actively re-plant native vegetation for all temporarily disturbed areas. The plan will include planting fast growing, locally native plant species to minimize the potential for establishment of aggressive, invasive species.

Navigable Waters

The proposed US 701 project would involve replacing the three existing bridges over Yauhannah Lake, the Great Pee Dee River, and the Great Pee Dee River Overflow. A Letter of Intent for this project was sent to the Office of the U.S. Coast Guard, Environmental Management Division in Washington, DC at the onset of this project (see the Appendix B, Page B-140). A response letter was received from the U.S. Coast Guard, Office of Bridge Permit Division in Washington, DC, dated January 4, 2005 (see the Appendix B, Page B-47), indicating that the Coast Guard's jurisdiction with this project is limited to any associated bridge work across navigable waters of the United States. This letter also indicated that the original letter of intent was forwarded to the USCG's Seventh Coast Guard District Bridge Office in Miami, Florida, under whose cognizance this project would fall.

On January 26, 2005 (see the Appendix B, Page B-48) the USCG's Seventh Coast Guard District Bridge Office indicated in a letter that this site is a federal project channel, and a formal Coast Guard permit will be required for the proposed bridge replacement project. However, if this project is federally funded, then the Federal Highway Administration has the responsibility to determine if a USCG permit is required.

On September 28, 2009 SCDOT wrote a letter to the FHWA requesting a determination regarding the requirements for a USCG permit (see the Appendix B, Page B-49). At that time, FHWA determined that a USCG permit was not required. FHWA sent a letter to USCG stating that a permit is not required for this project (see the Appendix B, Page B-51).

In a letter dated December 4, 2009 addressed to the Federal Highway Administration, the United States Coast Guard (USCG) confirmed that its research and examination indicated that the Great Pee Dee River is navigated by vessels greater than 21 feet in length both upstream and downstream of the proposed site. A copy of the

letter is included in the Appendix B, Page B-52. In this letter, the USCG advised that the proposed project will require approval of the proposed location and plan through the issuance of a Coast Guard Bridge Permit. The letter also stated that Coast Guard bridge permits will not be required for the proposed US 701 replacement bridges over the Great Pee Dee River Overflow and Yauhannah Lake, in accordance with 23 CFR Part 650 *(Bridges, Structures, and Hydraulics)*, Subpart H *(Navigational Clearances for Bridges)*, section 650.805 *(Bridges not requiring a USCG permit)*.

The construction of the proposed Great Pee Dee River Bridge will require a USCG Bridge Permit in compliance with Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. The existing structure, over the Great Pee Dee River's navigational channel, is a fixed-span bridge with a vertical clearance of approximately 37 feet above mean high water (NAVD 88) and a horizontal clearance of approximately 110 feet between the concrete bridge supports. The depth of the navigational channel is approximately 16.5 feet below mean low water. The proposed fixed-span bridge will at least provide equivalent navigational clearances. The proposed vertical and horizontal clearances for the replacement bridge over the Great Pee Dee River is shown in Figure 16.

Although no Coast Guard bridge permits will be required for the replacement bridges over the Great Pee Dee River Overflow and Yauhannah Lake, other areas of jurisdiction apply. The following stipulations must be met:

- Timely notice of any and all events that may affect navigation shall be given to the District Commander during construction of the proposed project.

- Upon completion of design and finalization of the location, the Coast Guard shall be contacted regarding approval of lights and other signals that may be required under 33 CFR 118. Approval of said lighting or waiver shall be obtained prior to construction.

- Upon completion of construction, the SCDOT shall submit "as built" drawings (8 ½ " x 11") showing clearances through the bridges and sufficient data to assist the USCG to prepare a completion report. This report will be used for Coast Guard and other mariner publications.

A permit for construction in navigable waters, issued by the SCDHEC, is required for activities occurring in or above state navigable waters. State navigable waters include waters that may be navigated by small pleasure or fishing boats. The permits required by Sections 404 and 401 would serve as the state navigable waters permit and no separate application would be required.

During construction of the new bridge, SCDOT will ensure that there will be no unreasonable interference with navigation. Upon completion of the new bridge and the shifting of traffic onto the new bridge, the existing bridge will be removed in its entirety. The piers and substructures of the existing bridge as well as the piers of a previous bridge will be removed to the natural river bottom in accordance with SCDOT standard specifications (Section 202.4.2.4).

Based on all of the information gathered to date, such as but not limited to public meetings, property owner interviews, and land use plans, SCDOT determined that the project design will meet the reasonable needs of navigation for this section of the Great

Pee Dee River.

Permits

The project will require the following permits and certifications:

- Wetlands – Section 404 Permit: The Clean Water Act (Section 404) requires a permit for placing dredge or fill material in waters of the United States or wetlands under the authority of the United States Army Corps of Engineers (USACE). Further discussions are included in the Wetlands subsection (Page 34).

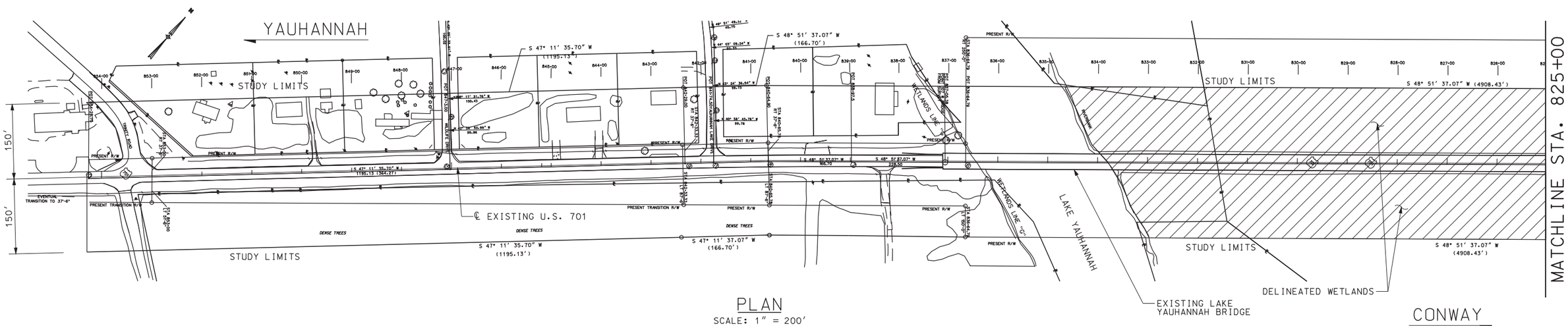
- Water Quality Certification – Section 401: The proposed project will require Clean Water Act Section 401 Water Quality Certification. Further discussions are included in the Water Quality subsection (Page 32).

- Coastal Zone Consistency Determination: As a division of SCDHEC, the Office of Ocean and Coastal Resource Management (SCDHEC-OCRM) is responsible for protecting the State's coastal zone and critical areas. The coastal zone includes all lands and waters in the eight coastal counties of South Carolina. The critical areas are the coastal waters, tidelands, beaches and beach/dune systems. The proposed project is located in a coastal county, but is not expected to involve impacts to critical areas. Therefore, SCDHEC-OCRM must provide a consistency determination to ensure the project would be consistent with the local management program.

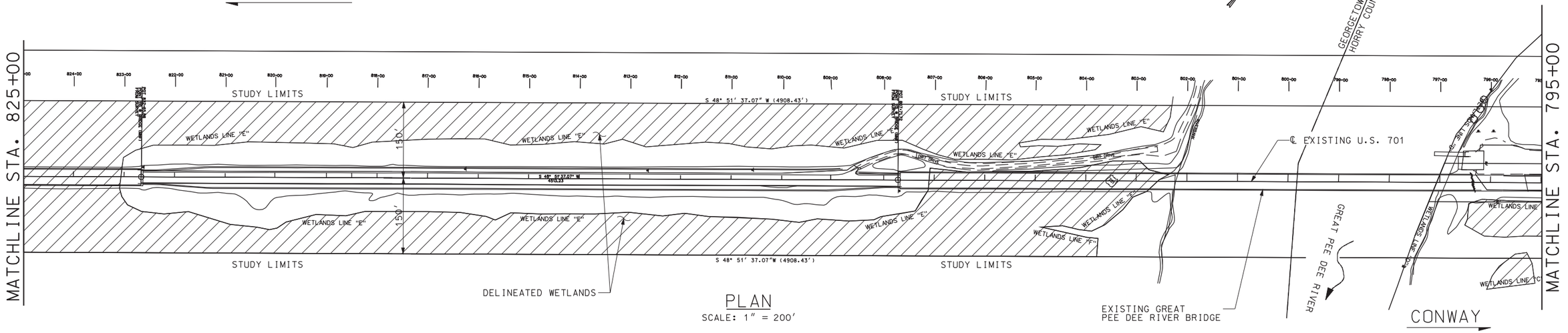
  The wetland permit (Section 404) along with the concurrent Section 401 Water Quality Certification, issued by the SCDHEC Bureau of Water, and the Coastal Zone Consistency Determination, issued by the SCDHEC-OCRM, will be addressed through a joint application process, with the Corps of Engineers as the lead agency.

- US Coast Guard Bridge Permit: The construction of the proposed Great Pee Dee River Bridge will require a USCG Bridge Permit in compliance with Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. Further discussions are included in the Navigable Waters subsection (Page 38).

- NPDES Construction General Permit: A National Pollutant Discharge Elimination System (NPDES) permit pursuant to Section 402 of the Clean Water Act will be required for construction activities. The SCDHEC is responsible for managing the NPDES program to assure stormwater runoff during construction will not have an adverse effect on water quality.



PLAN
SCALE: 1" = 200'



PLAN
SCALE: 1" = 200'

FIGURE 14: WETLANDS DETERMINATION- SHEET 1

WETLANDS SURVEYED
BY B.P. BARBER & ASSOCIATES, INC.
APRIL 22, 2005

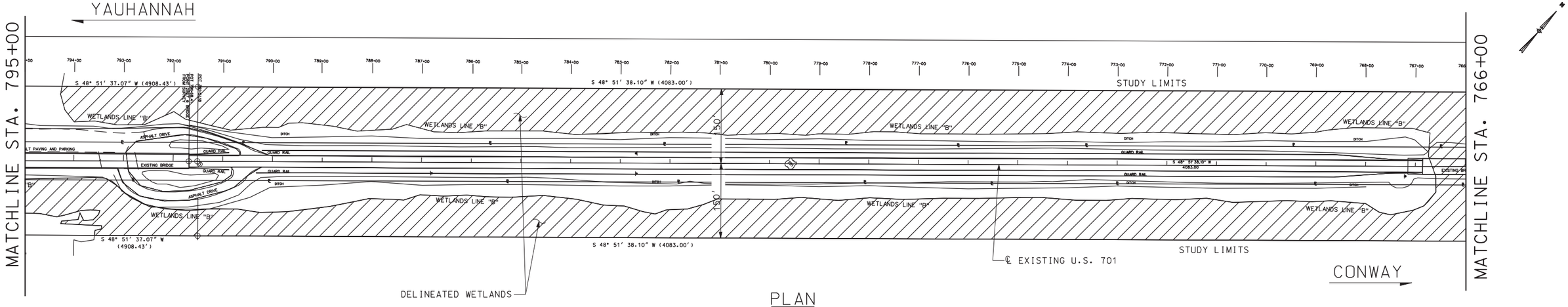
TUHIN BASU & ASSOCIATES, INC.

SCDOT

REPLACEMENT OF US 701 BRIDGES OVER GREAT PEE DEE RIVER, PEE DEE OVERFLOW & YAUHANNAH LAKE

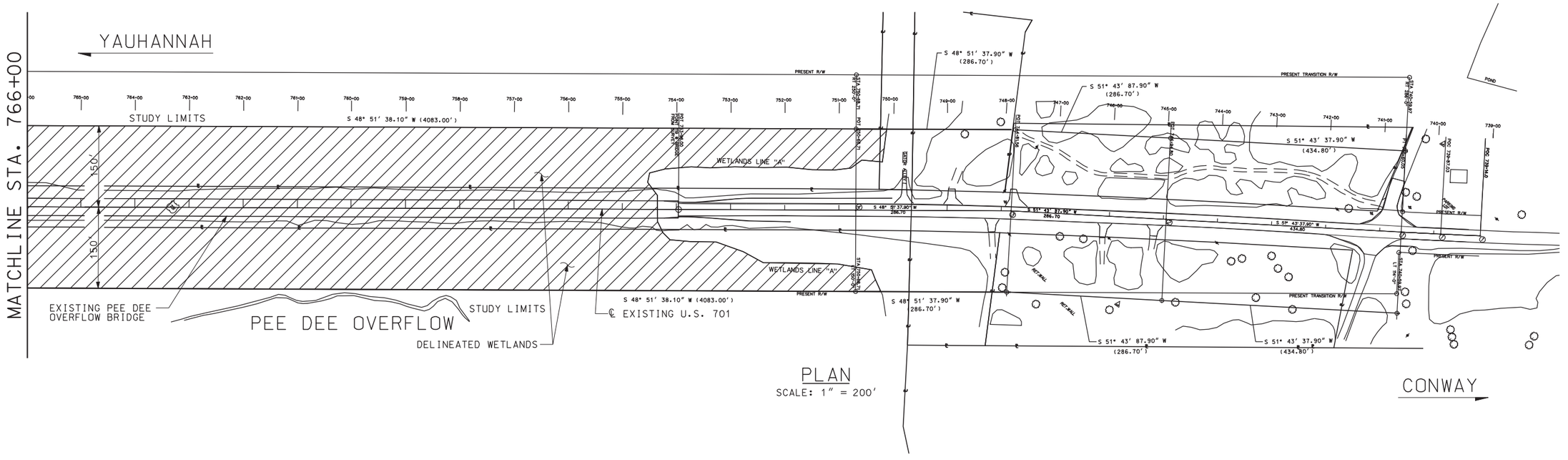
HORRY/GEORGETOWN COUNTIES, SC

Sheet No. 1



PLAN

SCALE: 1" = 200'



PLAN

SCALE: 1" = 200'

FIGURE 15: WETLANDS DETERMINATION-SHEET 2

WETLANDS SURVEYED
BY B.P. BARBER & ASSOCIATES, INC.
APRIL 22, 2005

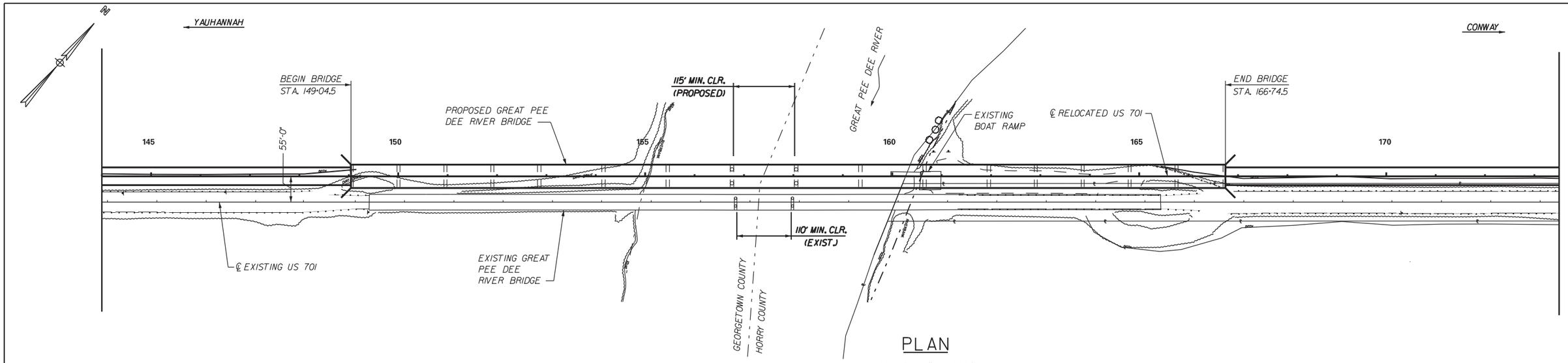
TUHIN BASU & ASSOCIATES, INC.

SCDOT

REPLACEMENT OF US 701 BRIDGES OVER
GREAT PEE DEE RIVER, PEE DEE OVERFLOW
& LAKE YAUHANNAH

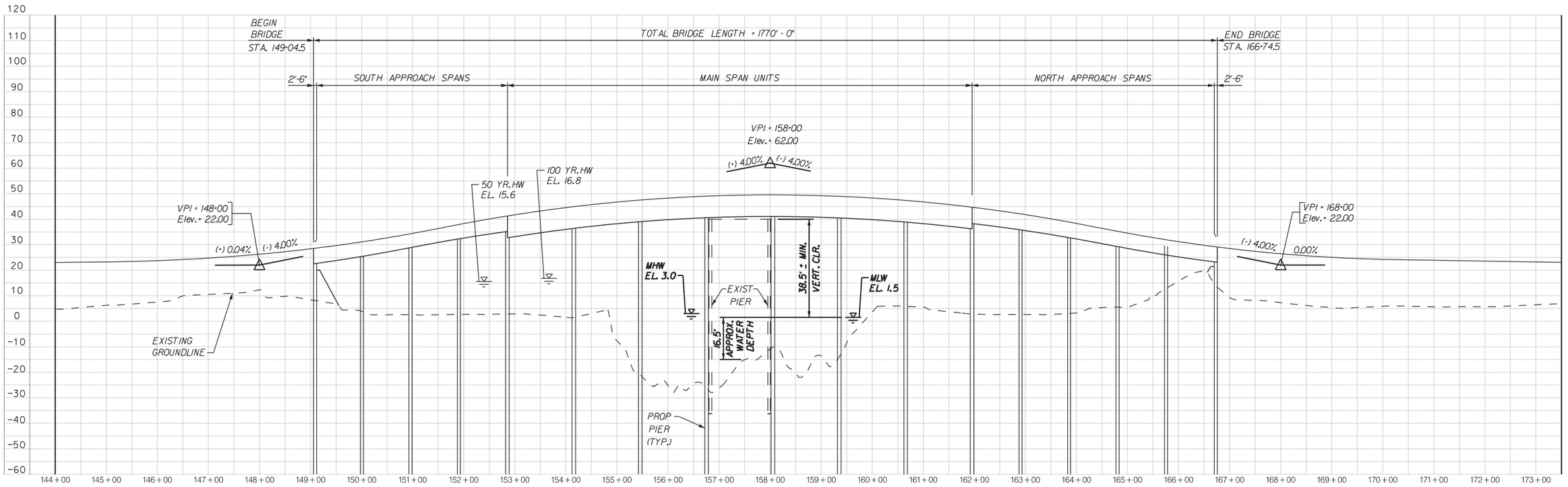
HORRY/GEORGETOWN COUNTIES, SC

Sheet No. 2



PLAN

SCALE: 1" = 200'



ELEVATION

H SCALE: 1" = 200'

V SCALE: 1" = 40'

FIGURE 16

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

REPLACEMENT OF US 701 BRIDGES OVER
GREAT PEE DEE RIVER, PEE DEE OVERFLOW
& YAUHANNAH LAKE

43

HORRY/GEORGETOWN COUNTIES, SOUTH CAROLINA

GREAT PEE DEE RIVER BRIDGE
PLAN & ELEVATION SHOWING
PROPOSED NAVIGATIONAL CLEARANCES

Terrestrial and Aquatic Wildlife

The following paragraphs summarize information related to terrestrial and aquatic wildlife that can be found in the Natural Resources Summary Report in the enclosed CD.

The preferred alternative will result in a permanent wetland impact of approximately 9.47 acres. The wetlands impacted consist of palustrine forested floodplain wetland, which includes predominantly bald cypress, swamp tupelo, red maple, river birch, titi, willow oak, and laurel oak. A variety of wildlife including several bird species, amphibians and reptiles utilize this habitat. Additionally, mammals such as white tailed deer, raccoons, and squirrels occupy the area. Mature hardwood trees are preferred nesting sites for cavity nesters such as owls, wood peckers and squirrels. Several duck species, including resident wood ducks and several migratory waterfowl species utilize the swamp habitat of the Waccamaw National Wildlife refuge. At either end of the corridor, the habitat becomes a drier, sandy upland with loblolly pine, water oak, and other typical upland tree species. The riverine and deepwater habitats of the Great Pee Dee River and Yauhannah Lake include many species of fish, freshwater turtles and other reptiles, and other water dependent animals.

A review of the SCDNR Heritage Trust Inventory of Rare, Threatened and Endangered Species has indicated that the Rafinesque's big eared bat (*Corynorhinus rafinesquii*) has been known to occur beneath the Great Pee Dee River Overflow Bridge and the Yauhannah Lake Bridge. In a letter dated February 14, 2005 (See the Appendix page A-150), SCDNR stated that two colonies of Rafinesque's big eared bat were observed roosting under the US 701 bridges proposed for replacement. At a May 2, 2008 meeting with the Department in Columbia, South Carolina, the refuge manager also provided information, in the form of his e-mail communications with bat researchers, that two groups of bats were observed beneath the Yauhannah Lake bridge in 2002, one of which was a maternal colony of 21 individuals. The maternal colony used the bridge again in 2003. The Rafinesque's big eared bat is not a Federally listed threatened or endangered species; however, the bat is rare in South Carolina and is considered a State endangered species.

Artificial and natural structures can be used as day and night roosts for the bats throughout the year; however, studies have shown that big eared bats rarely use bridges during winter.[4] Removal of the existing bridges will remove this roosting structure; however, the existing bridges will not be removed until the new bridges are constructed, and the new bridges will provide new roosting structure.

Construction of the new bridges may create a temporary disturbance to the bats utilizing the existing structures. However, according to information from Bat Conservation International (BCI), bats roosting in bridges become accustomed to vibrations and sounds associated with normal traffic, and structural maintenance only has an effect if the bats are exposed or if foreign materials are introduced. BCI

[4] Bennett, Frances M., Susan Loeb, Mary S. Bunch & William W. Bowerman. 2008
Use and Selection of Bridges as Day Roosts by Rafinesque's Big-Eared Bats.
The American Midland Naturalist. 160:386-389

researchers have observed crews working on and around bat occupied structures with no apparent effects.[5]

The bats prefer large, concrete-girder bridges and avoid flat bottomed slab bridges.[6] The proposed bridges over the Great Pee Dee River Overflow and Yauhannah Lake will be of concrete girder construction and will have longer spans than the existing bridges providing more roosting habitat for the bats.

If existing bridge demolition activities are expected to occur in late fall to early winter which is the typical maternal roosting period of the Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), prior to performing demolition work during this period, the district personnel/contractor will coordinate with SCDOT Environmental Management Office to prepare an appropriate plan to minimize interference with maternal roosting. Such a plan could include temporary moratoriums that limit certain activities and/or methods to prevent roosting, such as netting or other physical barriers. The plan would also contain provisions for monitoring for maternal roosting activities.

The swallow tailed kite (*Elanoides forficatus*) is a federal species of concern and State endangered species, which is also known to exist in the vicinity of the project corridor. According to information provided by the refuge manager, as documented in the Natural Resources Summary Report, the kite is known to use the wooded swamp around Cowford Lake (to the southeast of the existing US 701 alignment) as a nesting area. Additional information provided by the refuge manager has indicated various kite sightings in the vicinity of the existing US 701 alignment as well as being scattered throughout the refuge area. For the record of a telephone conversation on January 14, 2005 with the refuge manager, see the Appendix, page A-173. The kite was not observed in the project corridor area during reconnaissance efforts; however, on the southeastern side of the existing US 701 alignment the kite is known to use the wooded swamp around the southeastern side of Cowford Lake. Alternative 2 (55' upstream) would keep the new alignment further away from the Cowford Lake in relation to the current alignment. This placement will reduce the roadway noise level around Cowford Lake. The ecosystem around Cowford Lake would be better protected with Alternative 2. Alternative 2 alignment is located parallel and adjacent to the existing alignment and uses new roadway fill overlapped with the existing fill. The aquatic wildlife would not be further fragmented by not placing an independent embankment further away. Two occurrences of kite nesting have been documented further to the northwest of the existing alignment. However, the closest of these occurrences is located approximately 3,000 feet northwest of the existing alignment.

No other bridging is located over the Great Pee Dee River system in this area except for the US 378 bridge, located approximately 24 miles to the northwest, the US 378 bridge over the Little Pee Dee River, located approximately 13 miles northwest, or the US 17 bridge over the Waccamaw River, located approximately 21 miles to the south-southwest. Except for the existing US 701 bridging and causeways, the

[5] Keely, B.W. and M.D. Tuttle, 1999. Bats in American Bridges. Bat Conservation International, Inc. Resource Publication No. 4

[6] Bennett, Frances M., Susan Loeb, Mary S. Bunch & William W. Bowerman. 2008 Use and Selection of Bridges as Day Roosts by Rafinesque's Big-Eared Bats. The American Midland Naturalist. 160:386-389

bottomland forest and swamp habitat continues relatively uninterrupted for many miles upstream and downstream, providing habitat for a number of species. The potential impacts to the shortnose sturgeon and the Atlantic sturgeon have been discussed in the threatened or endangered species section. No other notable impacts to wildlife are expected. All three proposed bridges will be longer than the existing bridges and furthermore, the bridge spans for all three bridges will be generally longer than the existing bridge spans. This longer bridging, combined with removal of some of the existing causeway fill will permit greater opportunity for wildlife passage. Through the use of required BMPs erosion control methods necessary to curtail runoff during construction, and the use of SCDOT designated seeding techniques; there should be no substantially increased impact on water quality in the area as a result of this project. Therefore, major impacts to aquatic wildlife are not expected.

During field reviews, SCDOT biologists noticed the nests of barn swallows (*Hirundo rustica*). The nesting season of the barn swallows occurs from mid-May through August. The Department will comply with the Migratory Bird Treaty Act of 1918 in regard to the avoidance of taking of individual migratory birds, such as the barn swallows, and destroying their active nests. Prior to construction/demolition of the bridges the district personnel/contractor will coordinate with SCDOT Environmental Management Office to determine if there are any active nests on the bridge. After this coordination, it will be determined whether construction/demolition can begin. After construction/demolition has begun, measures can be taken to prevent birds from nesting, such as netting, noise producers, and etc. If during construction or demolition a nest is observed on the bridge that was not discovered during the biological surveys, the contractor will cease work and immediately notify the SCDOT Environmental Management Office. SCDOT biologists will determine whether the nest is active and the species utilizing the nest. After this coordination, it will be determined whether construction/demolition can resume or whether a temporary moratorium will be put into effect.

Federally listed threatened and endangered species, including the shortnose sturgeon, are further discussed in the Biological Assessments, see the Appendix, beginning page A-1.

Wild and Scenic Rivers

None of the water bodies affected by the US 701 Bridge replacement project are federally listed as wild and scenic rivers. However, the Great Pee Dee River, from the US 378 Bridge at Florence / Marion Counties to the US 17 Bridge in Georgetown is included in the SCDNR State Scenic River Program.

Floodplains

Based on a study of the Flood Insurance Rate Maps (FIRM) for Georgetown County and Horry County, South Carolina, published by the Federal Emergency Management Agency (FEMA), the proposed project would involve construction within

the 100-year floodplain limits associated with the Great Pee Dee River and Yauhannah Lake floodplains. The Flood Insurance Rate Maps designate this area as a Special Flood Hazard Area Zone A. As a designated Zone A area, the floodplain limits shown on the maps are determined by approximate methods. Due to potential impacts of the proposed project on the floodplain, a detailed hydraulic study of the bridge crossing was performed as part of the project. The hydraulic study included a one-dimensional hydraulic analysis, based on guidelines provided in the SCDOT Requirements for Hydraulic Design Studies (latest edition) as well as applicable FEMA and SCDNR guidelines. The one-dimensional hydraulic analysis is included in the enclosed CD.

The one-dimensional hydraulic model was developed for the natural, existing, and proposed conditions to measure the potential impacts from the project. A hydrological analysis of the watershed was completed to estimate design flows and project surveys and mapping were used to develop the hydraulic model. The existing conditions include a total of 4,363 feet of total bridge length including a 1,603 foot bridge at the Great Pee Dee River. The proposed bridge configuration includes a total bridge length of 4,593 feet including a 1,770 foot bridge at the Great Pee Dee River. The proposed bridges will also include longer spans which reduce future obstructions within the floodplain. The increase in bridge length as well as the increased efficiency in bridge spans will reduce backwater for the proposed conditions. The existing 100-year high water flood elevation is 16.9' (NAVD 88) above mean sea level with 0.4' of backwater, and the proposed 100-year high water flood elevation is 16.8' (NAVD 88) with 0.3' of backwater. The one-dimensional hydraulic study with the Floodplains Checklist (included in the enclosed CD) for the proposed condition therefore resulted in a backwater of less than 1.0 foot for the 100-year flood, therefore, satisfying FEMA and SCDOT criteria. As the project design is completed, a two-dimensional analysis will be developed to provide additional necessary design data for the project.

The project will not be a significant or longitudinal encroachment as defined under 23 CFR 650A, nor is it expected to have an appreciable environmental impact on this base floodplain as documented in the hydraulic analysis report. According to U.S. Department of Transportation (USDOT) Order 5650.2, Floodplain Management and Protection, "Expansion of a facility already located within a floodplain usually would not be considered a significant encroachment." The USDOT Order 5650.2 further defines a significant encroachment as involving one or more of the following impacts:

1. A considerable probability of loss of human life,
2. Likely future damage associated with the encroachment that could be substantial in cost or extent, including interruption of service on or loss of a vital transportation facility, and
3. A notable adverse impact on natural and beneficial floodplain values.

As documented in the study, the level of risk associated with the probable area of flooding and its consequences attributed to this encroachment is not any greater than that associated with the present roadway. The proposed alternative increases the total bridged area within the floodplain, thus reducing the backwater from the existing roadway and bridge conditions.

Air Quality

The project is located in portions of Horry and Georgetown Counties. Both of these counties are currently in attainment with all National Ambient Air Quality Standards

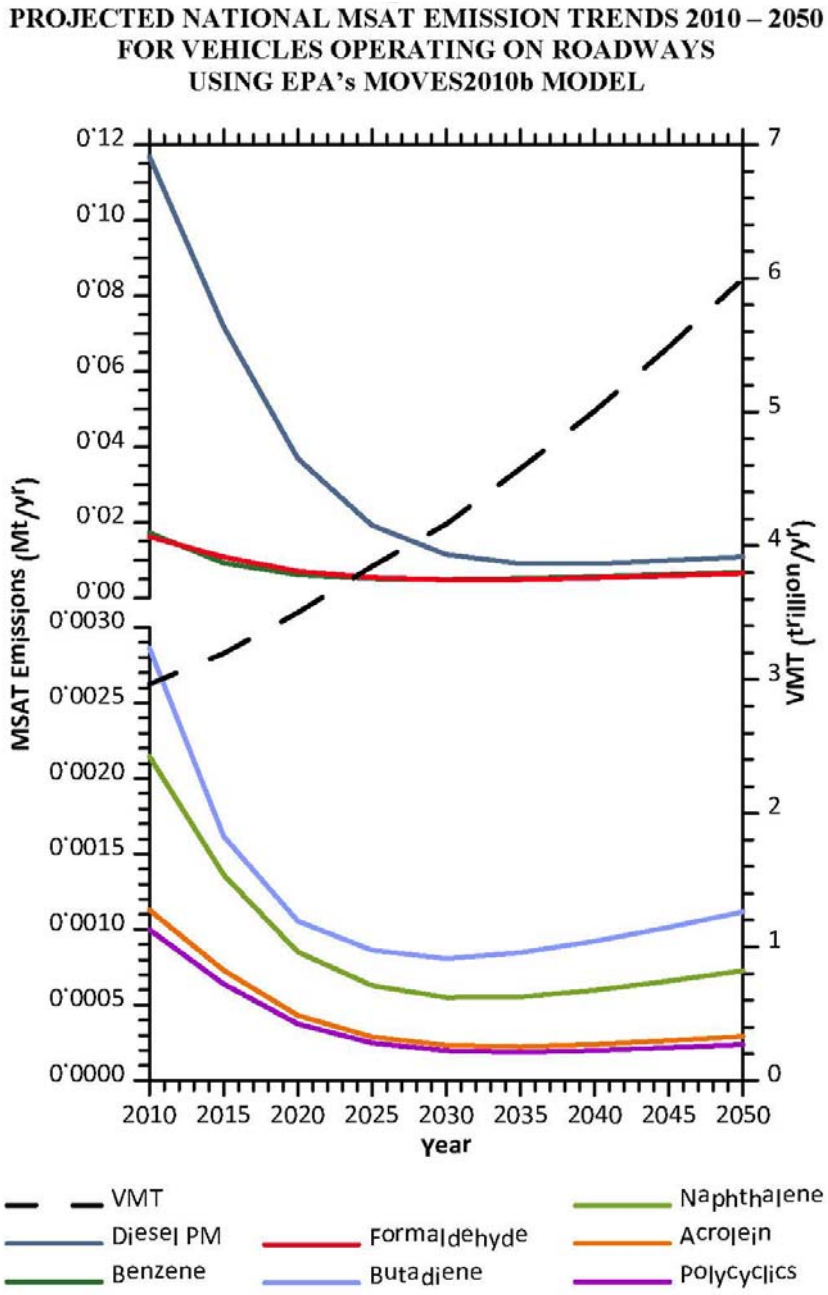
(NAAQS) according to data from the South Carolina Department of Health and Environmental Control. Given the attainment status there is no requirement for transportation control measures or conformity to maintain the area's air quality at this time.

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), the U.S. Environmental Protection Agency (EPA) also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs)

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead Federal Agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Control of Hazardous Air Pollutants from Mobile Sources. EPA-HQ-2005-0036 (February 26, 2007). This rule was issued under the authority in Section 202(1) of the Clean Air Act. In its rule, EPA reexamined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. The EPA identified seven compounds that are considered priority mobile source air toxics. Between 2010 and 2050, FHWA projects that even with a 102 percent increase in U.S. annual vehicle miles traveled (VMT); these programs will reduce combined on-highway emissions of the priority MSATs by 83 percent, as shown in the following graph, Figure 17.



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

FIGURE 17: VMT VS. MSAT Emissions[7]

[7] FHWA – Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents. December 6, 2012

The purpose of this project is to replace the existing functionally deficient bridges by constructing new bridges on an adjacent alignment. This project has been determined to generate minimal air quality impacts for CAAA criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the no-build alternative.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES model forecasts a combined reduction of over 80 percent in the total annual emission rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by over 100 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

Noise

The Code of Federal Regulations (CFR) Section 23, Part 772 contains the Federal Highway Administration (FHWA) traffic noise standards. The South Carolina Department of Transportation (SCDOT) has implemented these standards in its Traffic Noise Abatement Policy. A traffic noise analysis is required for proposed Federal-aid highway projects that will construct a highway on new location or physically alter an existing highway, which will significantly change either the horizontal or vertical alignment of the road or increase the number of through-traffic lanes. Traffic noise impacts are predicted for this project. Noise abatement measures have been considered for reducing or eliminating the traffic noise impacts in accordance SCDOT's Traffic Noise Abatement Policy.

An original noise analysis was completed for this project in May of 2009. The new noise analysis was prepared to comply with the revised SCDOT Traffic Noise Abatement Policy implemented in July of 2011 and to evaluate another proposed alternate, Alternative 2, as well as a No-Build Alternative.

An analysis was performed on U.S. 701 from Trinity Road in Georgetown County to Lucas Bay Road in Horry County to determine the effect of the project on traffic noise levels in the immediate area (Figure 1). This investigation includes an inventory of existing noise sensitive land uses, and a field survey of background (existing) noise levels in the project study area. It also includes a comparison of the predicted noise levels and the background noise levels to determine if traffic noise impacts can be expected resulting from the proposed project. Traffic noise impacts are predicted for this project.

TNM version 2.5, A Federal Highway Administration (FHWA) traffic noise prediction model was used in the analysis to compare existing and future Leq(h) noise levels. Leq(h) is the average energy of a sound level over a one hour period. A-weighted decibels (dBa) are the units of measurement used in the study.

Existing noise measurements were taken in the vicinity of the project to quantify the existing acoustic environment and to provide a base for assessing the impact of noise level increases. Model inputs included existing and proposed roadway

characteristics, estimated traffic volumes, and receiver locations. Table 2 lists the traffic data used to estimate Leq(h) noise levels expected to occur in the project area by the year 2032.

Table 2 - Traffic Data for Noise Analysis

Roadway Section	Speed (mph)	Two Way Design Hourly Traffic	One Way Hourly Traffic	Hourly Volume Cars (vph)	Hourly Volume Medium Trucks (vph)	Hourly Heavy Trucks (vph)
2012 Traffic Computations						
U.S. 701	55	880	440	378	18	44
2032 Traffic Computations						
U.S. 701	55	1230	615	529	25	62

Table 3 shows the comparison of field measurements versus modeled noise levels. The calculated noise levels for the measurement sites range from 48.0 to 65.4 dBA. The difference between calculated and field measured noise levels at all five locations is 3 dBA or less, validating the results of the TNM model.

Table 3 - Existing TNM Calculated Noise Levels vs. Field Measurements

Site	Location	Field Measure-ment Noise Level (dBA)	TNM Calculated Noise Level (dBA)	Difference (dBA)
1	U.S. 701/Trinity Road/Ellis Landing Road	66.9	65.4	1.5
2	U.S. 701/Yauhannah Lake Drive	61.6	59.2	2.4
3	9265 N. Fraser Street (U.S. 701)	62.0	59.0	3.0
4	Public Boat Ramp at Great Pee Dee River	58.1	60.2	-2.1
5	Walking Trail at Oxbow	49.8	48.0	1.8

Difference = Measured Leq minus Modeled Leq

The Federal Highway Administration (FHWA) has developed Noise Abatement Criteria (NAC) and procedures to be used in the planning and design of highways to determine whether highway noise levels are or are not compatible with various land uses (Table 4). The abatement criteria and procedures are set forth in the aforementioned Federal reference (Title 23 CFR Part 772).

Table 4 – FHWA Noise Abatement Criteria

Activity Category	Activity Criteria\2\		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its purpose.
B\3\	67	70	Exterior	Residential
C\3\	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E\3\	72	75	Exterior	Motels, hotels, offices, restaurant/ bars, and other developed lands, properties or activities not included in A-D or F

F	--	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	--	--	--	Undeveloped lands that are not permitted

\1\ Either Leq(h) or L10(h) (but not both) may be used on a project
\2\ The Leq(h) and L10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures
\3\ Includes undeveloped lands permitted for this activity category

Activity Category A consists of tracts of land that are locally significant for their serenity and quiet surroundings. Activity Category B consists of residential properties. Activity Category C consists of exterior locations of public outdoor areas, places of worship, cemeteries, recreational areas, etc. Activity Category D consists primarily of the same activities as Activity Category C but is for interior locations. Activity Category E consists of hotel/motels, offices, restaurants, and other developed land with activities not included in Activity Categories A-D. Activity F consists of agricultural lands, airports, and commercial/industrial facilities. Activity G is for undeveloped lands not presently permitted. Activity Categories adjacent to the project are mostly residential (B).

Traffic noise impacts occur when the predicted traffic noise levels either: (a) approach or exceed the FHWA noise abatement criteria ("approach" meaning within 1 dBA of the value listed in Table 4), or (b) substantially exceed the existing noise levels. According to the SCDOT Traffic Noise Abatement Policy, a 15 dBA increase is deemed to be a "substantial increase." Consideration for noise abatement measures must be given to receivers that fall in either category.

The results of the noise analysis indicate that traffic related noise impacts would occur to eight (8) receivers under the 2032 Build Alternative 2 and 6 (six) receivers under the 2032 Build Alternative 3. However, eight (8) receivers would be impacted under the 2032 No-Build Alternative. No receivers in the project area would substantially exceed the FHWA noise abatement criteria. The original noise analysis completed in May of 2009, for Alternative 3, resulted in 11 receivers being impacted in future build conditions. No receivers were found to substantially exceed the FHWA noise abatement criteria.

Predicted build-condition traffic noise level contours are not a definitive means by which to assess traffic noise level impacts; however, they can aid in future land use planning efforts in undeveloped areas. Table 5 summarizes the predicted distances to the 72, 67, and 66 dBA noise level contours and the noise impact analysis results.

Table 5: Activity Category Critical Distances and Noise Impact Analysis

STUDY AREA	Leq(h) NOISE LEVELS[1]			ACTIVITY CATEGORY DISTANCES[2] (ft)		
	25 ft	50 ft	100 ft	72 dBA	67 dBA	66dBA
U.S. 701	77.3	73.8	68.7	76	135	151

ROADWAY LOCATION	TOTAL NO. OF RECEIVERS	APPROXIMATE # OF IMPACTED RECEIVERS ACCORDING TO TITLE 23 CFR PART 772 / SCDOT POLICY				
		A	B	C	D	E
2032 Year No-Build Alternative						
U.S. 701 – No-Build	26	---	**8**	---	---	---
2032 Year Build Alternatives						
U.S. 701 – Alternative 2	26	---	**8**	---	---	---
U.S. 701 – Alternative 3	26	---	**6**	---	---	---

1. 25 ft, 50 ft & 100 ft distances are measured from the outside edge of pavement
2. 72 dBA, 67 dBA and 66 dBA activity category distances are measured from the proposed centerline of the roadway

If traffic noise impacts are predicted, noise abatement measures for reducing or eliminating the noise impacts must be considered. Noise abatement measures were evaluated for this project but were found not to be acoustically feasible since it would not provide at least a 5 dBA noise reduction to impacted receivers due to the number of access breaks.

The major construction elements of this project are expected to be earth removal, hauling, grading, paving, and pile driving. General construction noise impacts, such as temporary speech interference for passers-by and those individuals living or working near the project, can be expected particularly from pile driving, paving operations, and earth moving equipment during construction. However, considering the relatively short-term nature of construction noise and the likely limitation of construction to daytime hours, these impacts are not expected to be substantial. The contractor would be required to comply with applicable local noise ordinances and OSHA regulations concerning noise attenuation devices on construction equipment.

In summary, the results of the revised noise analysis indicate that traffic related noise impacts would occur to eight (8) receivers under the 2032 Build Alternative 2 and six (6) receivers under the 2032 Build Alternative 3. However, eight (8) receivers would be impacted under the 2032 No-Build Alternative. No receivers in the project area would substantially exceed the FHWA noise abatement criteria. Noise abatement measures were evaluated for this project but were found not to be acoustically feasible since it would not provide at least a 5 dBA noise reduction to impacted receivers due to the number of required access breaks.

Hazardous Waste and Underground Storage Tanks

A Hazardous Material / Waste Site Assessment was prepared for the project corridor and that report is included in the enclosed CD. Hazardous waste/material sites are regulated by the Resource Conservation and Recovery Act (RCRA), as amended, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and the Superfund Amendments and Reauthorization Act of 1986 (SARA). An Initial Site Assessment (ISA) was conducted by the SCDOT Right of Way Office to identify possible sites involving the presence and/or past use of underground storage tanks (USTs), above ground storage tanks (ASTs), and/or other hazardous materials within the project corridor. A review of available regulatory data and an on-site reconnaissance survey of the project corridor were performed.

The ISA identified one site within the study area that contained USTs. The Pee Dee Grocery, located near the northeastern terminus of the project corridor, is a registered UST site. Four 4,000 gallon USTs are located on-site, approximately 40 feet northwest of the centerline of the existing US 701 alignment. Additionally, three ASTs are located on the northwestern portion of the site, approximately 150 feet northwest of the centerline of the existing US 701 alignment. A release has not been reported for this site; however, SCDHEC file information indicates that the USTs have been in place since 1987. If portions of this site will be acquired for new right of way, or if excavation will occur on this site, the collection of soil (and possibly ground water samples) would be warranted. Also, sampling would be warranted in the event that excavation or dewatering will be conducted in the vicinity of the UST site. The Department will test the UST sites along the project corridor for potential contamination before construction begins.

It is the SCDOT's policy to avoid the acquisition of underground storage tanks and other hazardous materials, if possible. If avoidance is not a viable alternative, tanks and other hazardous materials will be tested and removed and/or treated in accordance with EPA and SCDHEC requirements. Cost of necessary remedial actions would be considered during the right of way appraisal and acquisition process.

Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 as amended requires federal agencies to consider the effects of their actions on historic properties. In accordance with 36 CFR 800.4, archival research and coordination with the State Historic Preservation Officer (SHPO) was performed to identify and help predict the locations of significant cultural resources in the vicinity of the proposed action. The archaeological and architectural surveys performed were designed to provide the

necessary management data to allow for the sites and properties to be evaluated for recommendations of eligibility to the National Register of Historic Places (NRHP).

Cultural Resources Surveys have been conducted within the project corridor. The Cultural Resources Report is included in the enclosed CD. The Survey identified one NRHP eligible archaeological site within the corridor. This archaeological site (38GE18) was previously determined eligible for the NRHP. Site 38GE18 extends on both sides of US 701, on the southwestern side of Yauhannah Lake. The portion of the site northwest of US 701 has been heavily disturbed, and represents only a small portion of the site. The portion of the site on the southeastern side of US 701 is also disturbed adjacent to the existing road; however, there are intact archaeological remains further to the southeast that should be avoided (approximately 130 to 150 feet from the existing centerline of US 701).

The preferred alternative alignment is to be located 55 feet northwest (upstream) of the centerline of existing US 701. A portion of site 38GE18 on the southeastern side of US 701 has been disturbed. The limits of this disturbance are approximately 130 feet from the existing centerline of US 701. Beyond 130 feet, there are intact archaeological remains that should be avoided. The portion of the site affected by the project is a non-contributing element of NRHP eligible site 38GE18. There would be no ground disturbing activities beyond the 130 feet buffer zone south of the existing bridge. No adverse effects to site 38GE18 are anticipated from the project; however, monitoring by an archaeologist during ground disturbance activities in this area would be warranted. If any significant archaeological remains are discovered during construction, additional coordination would take place with SCSHPO and other interested parties. Additionally, two concrete Tee Beam bridges, constructed in 1953, are located in the project corridor. Both structures have been recommended not eligible for the NRHP.

Additionally, during the underwater survey, two underwater targets were identified. The first was located within the study area and was thought to be a submerged automobile. The second target was unidentified, and although outside the study area, the Department and SCSHPO were concerned that the use of a construction barge during new bridge construction may impact the target. An additional scope of work was conducted in order to identify whether or not these targets are significant cultural resources. A survey has also been conducted to assess the eligibility of the former bridge structure for the NRHP. A letter report dated May 30, 2006 on this additional underwater survey is included in the Cultural Resources Report in the enclosed CD.

The results of the additional underwater survey indicated that the targets in question are automobiles and, additionally, that two other automobiles are located adjacent to the bridge structure. No potentially significant cultural resources were identified during this additional underwater investigation, and no further underwater investigations are recommended. The additional architectural survey indicated that the former bridge structure is considered not eligible for the listing in the NRHP.

The appropriate documentation has been provided to the SHPO and also to the Catawba Indian Nation Tribal Historic Preservation Officer (THPO). The Department's letter dated March 13, 2009, stated that monitoring of site 38GE18 by one of the Department's archaeologists will take place during ground disturbing construction activities and personnel from the SHPO and the Catawba Indian Nation THPO will be

informed of these activities and afforded an opportunity to be present on-site. Additionally, if any significant portions of 38GE18 are encountered, construction activities in that area will be halted and it will be treated as a late discovery. The SHPO provided signed concurrence with the Department's findings on April 13, 2009 (see the Appendix B, Page B-120) and the Catawba Indian Nation THPO provided signed concurrence on April 1, 2009 (see the Appendix B, Page B-122). Please see the Appendix B, Page B-123 for a copy of the Memorandum of Agreement signed by the FHWA, the SCDOT, the USFWS, the Catawba Indian National Tribal Historic Preservation Office, and the South Carolina State Historic Preservation Office.

1) A Memorandum of Agreement (MOA) between the Department, the State Historic Preservation Office (SHPO), the Federal Highway Administration (FHWA), the United States Fish and Wildlife Service (USFWS), and the Catawba Indian Nation Tribal Historic Preservation Officer (CIN-THPO), was executed on June 20, 2012. The USFWS was a party executing this MOA because Site 38GE 18 is located on both USFWS and SCDOT property. The following are the stipulations outlined in the MOA:

    a) The southern bridge approach has substantially impacted a small portion of 38GE18. The project's "area of potential effect" will be limited to this area. To protect the adjacent intact potion of 38GE18, the FHWA and SCDOT will ensure that the boundaries of archaeological site 38GE18 are identified as a "Restricted Area" on all construction plans. The construction plans will include the following notation, "no ground-disturbing activities, including construction, heavy equipment access, and storage for equipment and materials are allowed within the Restricted Area." SCDOT will also inform the selected contractor about these restrictions at the Pre-Construction meeting where all special provisions are discussed.
    b) SCDOT's contractor will erect orange tree-saving fencing at the edge of the project's construction limits within the boundaries of archaeological site 38GE18 to clearly indicate the location of the "Restricted Area" as shown on the construction plans.
    c) All construction activities within the boundaries of archaeological site 38GE18 will be monitored by a professional archaeologist who meets the Secretary of the Interior's Professional Qualification Standards for Archaeology. (48 FR 44738-39).
    d) SCDOT will provide the FHWA, the USFWS, the SHPO, and the CIN-THPO with a written report that describes the results of monitoring activities.

    The MOA also states that all work within the boundaries of archaeological site 38GE18 will cease immediately if unanticipated cultural materials or human skeletal remains are discovered during construction monitoring activities. SCDOT will immediately inform the USFWS, the FHWA, the SHPO and the CIN-THPO about the late discovery.

Section 4(f) Resources

The US Department of Transportation Act (DOT Act) of 1966 included a special provision, Section 4(f), which established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. The law, now codified in Title 49 United States Code (U.S.C.) Section 303 and Title 23 U.S.C. Section 138, is implemented by the Federal Highway Administration (FHWA) through the regulation 23 CFR 774. Section 4(f) applies to projects that receive funding from an agency of the US Department of Transportation. FHWA and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

1) There is no prudent and feasible alternative to using that land; and,
2) The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

A Section 4(f) "use" occurs when property from a Section 4(f) site is permanently acquired and incorporated into a transportation project, or when there is occupancy of land that is adverse in terms of the statute's preservationist purposes of maintaining the integrity of the Section 4(f) resource. A "constructive use" of Section 4(f) property occurs when the proximity impacts of a transportation project on a Section 4(f) resource, even without any acquisition of property, result in substantial impairment of the features and attributes which render that property a Section 4(f) resource.

When FHWA determines that a project may use Section 4(f) property, there are three methods available for the approval of the use:

1) Preparing a de minimis impact determination;
2) Applying a programmatic Section 4(f) evaluation; or
3) Preparing an individual Section 4(f) evaluation.

The proposed project consists of the replacement of three bridges on US 701 over the Great Pee Dee River, Great Pee Dee River Overflow and Yauhannah Lake in Georgetown and Horry Counties, South Carolina. The requirements of Section 4(f) apply to the proposed project because the proposed Build Alternatives would require the use of land from wildlife and waterfowl refuge and recreational facilities. These two resources are discussed below.

Waccamaw National Wildlife Refuge

A major portion of the project corridor traverses the Waccamaw National Wildlife Refuge, which in the area of the corridor is predominantly forested wetland. The Refuge is adjacent to US 701 on both sides of the roadway. The proposed project would encroach on the Refuge property. The Refuge was established in 1997 with the purposes to (1) protect and manage diverse habitat components within an important coastal river ecosystem for the benefit of endangered and threatened species, freshwater and anadromous fish, migratory birds, and forest wildlife, including a wide array of plants and animals associated with bottomland hardwood habitats; and, (2)

provide compatible wildlife-dependent recreational activities including hunting, fishing, wildlife observation, photography, and environmental education and interpretation for the enjoyment of present and future generations. Presently, the Refuge land totals 27,000 acres. The Refuge is actively pursuing the acquisition process for expansion to over 55,000 acres. The proposed project will provide safer access to the Refuge property and the visitors/education center from US 701. This safe access should allow for the increased level of intended future use of the Refuge by the public.

The Refuge meets the applicability requirements for Programmatic Section 4(f) Evaluation and Approval, established by the FHWA. A Programmatic Section 4(f) evaluation is included at the end of this Environmental Assessment document to address the potential impacts and mitigation measures for the Refuge. A copy of the Programmatic Section 4(f) Checklist and Evaluation is included in Appendix beginning on page B-1. Permanent impacts to the Refuge for Alternative 2 Alignment (Preferred Alignment) include an use of approximately 4.25 acres of Refuge land parallel and directly adjacent to the existing US 701 alignment. This will be less than 1% of the Refuge property. USFWS, FHWA and the Department executed a Memorandum of Agreement (MOA) in May/June, 2012 regarding the method of right of way acquisition calculations. A copy of the signed MOA is included in Appendix page A-115. Presently, the Refuge encompasses 27,000 acres and the proposed acquisition boundary spans over 55,000 acres. The Refuge should experience no net loss as a result of SCDOT's plans to make a payment for replacing the property impacted. The use of the Refuge will continue for its intended purpose.

There is ongoing coordination between the Department, FHWA and USFWS in regards to planning and preliminary engineering of the proposed project in regards to the impacts on the Refuge. Although, the 55 ft downstream alternative will have the least wetland impact, in order to avoid the Cowford Lake ecosystem and the higher quality wetlands on the downstream side of the existing US 701 alignment, the Biologists from the Department and the USFWS jointly recommended to place the new alignment to the upstream side of the existing US 701.

The Department and the FHWA acknowledged in the EA document that the proposed project will encroach into the Refuge property. The Department is committed to carry out the following additional compensatory mitigations after coordinating with the USFWS:

- Move New US 701 alignment to the upstream of the current alignment to minimize the possible impacts to the Cowford Lake ecosystem.

- Add a left turn lane on US 701 at the Entrance of the Refuge Visitor Center. The addition of a left turn lane will enhance the safety at this location and encourage use by citizens for many years to come.

- Monitor Archaeological Site 38GE18 during ground disturbing construction activities. A large portion of this site has been severely damaged or destroyed. However, a 20-foot wide strip on the Refuge property is intact and contributes to the National Register eligibility of the site. The SCDOT has made a commitment of monitoring of this site by one of the Department's archaeologists during ground disturbing construction activities. Personnel from

SHPO, the Catawba Indian Nation THPO, and USFWS Regional Historic Preservation Officer will be informed of these monitoring activities and afforded an opportunity to be present on-site if desired. If any inadvertent damage occurs to the site, or any late archaeological manifestations are discovered, reports will be made to SHPO, the Catawba Indian Nation THPO, and USFWS Regional Historic Preservation Officer. SCDOT's commitments also include that if any significant portions of the site are encountered, construction activities in that area will be halted and it will be treated as a late discovery. Please see Appendix B Page B-124 for a copy of the Memorandum of Agreement signed by the FHWA, the SCDOT, the USFWS, the Catawba Indian National Tribal Historic Preservation Office, and the South Carolina State Historic Preservation Office.

- Provide compensatory mitigation by paying an agreed upon lump sum amount that the Refuge can use to purchase replacement property.

The impacts imposed upon the Refuge by the proposed US 701 Project are minor. For Alternative 2, the amount and location of land required from the Waccamaw National Wildlife Refuge will not impair the activities, features, attributes, or intended use of the property, nor result in proximity impacts. USFWS concurred with this finding on October 17, 2012 (see the Appendix B, Pages B-98 & B-99)

Horry County Public Boat Landing

A public recreation area was identified within the project corridor study area. The Horry County Public Boat Landing is located beneath the existing US 701 Great Pee Dee River Bridge. The boat landing is used by Horry and Georgetown County residents, as well as persons from outside the general area, for recreational boating and fishing opportunities. This facility occupies approximately one acre of land, and provides a two-lane boat ramp, a courtesy dock and paved parking for approximately 22 vehicles/trailers. Current access to and from the existing Horry County Boat Landing facility needs improvements due to the location and configuration of the existing access roads.

Based on evaluations of conceptual alternative alignments, all alignments would result in unavoidable impacts to the boat ramp facility in varying degrees. For Alternative 2 (Preferred Alternative), the boat landing will be relocated to another nearby location on the Horry County side of the Great Pee Dee River, and new access roads from US 701 will be provided. The completed project will result in improved access to the boat landing for both north and southbound traffic, hence improving safety. Horry County has been notified of the proposed action for Alternative 2. Appendix B Page B-113 contains a copy of the concurrence letter signed by the Horry County Administrator providing his concurrence with the proposed action. Section 4(f) *De minimis* was prepared for the Horry County Public Boat Landing. A copy of the Section 4(f) *De minimis* Use Checklist and Evaluation is included in the Appendix B, beginning on page B-109.

Specifically, the SCDOT is committed to enhancing the Horry County Boat Landing facility with the following:

- A new boat landing facility will be built on the Horry County side of the Great Pee Dee River, either on the upstream side or on the downstream side of the proposed new bridge.

- New access roads will be built to and from US 701.

- New parking spaces will be built.

SCDOT will continue to coordinate with Horry County's engineering staff during the design development phase of this facility. Since the boat landing area also serves as an access point to the Refuge, SCDOT will also coordinate with USFWS while developing the proposed improvements.

The Horry County Public Boat Landing will be accessible as much as possible and safe during construction of the proposed project. However, there will be a period of time when construction activities will take place in and around the boat landing area, and the use of this facility may be impacted. The proposed project will provide a safer and improved access road system to and from US 701. Overall, after the proposed construction is complete, the boat landing users will enjoy the benefits of safer road systems, enhanced boat landing facility, and improved parking bays for cars and trailers. The proposed US 701 Project will have positive impact on the Boat Landing facility.

Relocation Impacts

Alignments for all six build alternatives were developed and analyzed for potential encroachments outside of the established SCDOT right of way within the project corridor. Alternatives 3, 4 and 5 would not require any property relocation. Alternative 1 would involve three residential relocations. Alternative 6 would involve one residential relocation.

The proposed project, under the preferred alternative (Alternative 2, 55 feet upstream), would involve one residential relocation. Property owners impacted by the project would be compensated for acquired property and for any damages to remaining property, in accordance with SCDOT policy and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Social and Economic Impacts

Social impacts identified in this assessment are effects on the residences and businesses adjacent to the corridor. It is not anticipated that the proposed action would result in any appreciable change in local population and employment patterns in the area. Right of way acquisitions from residential properties are not expected to cause a change in existing land uses. Right of way taking would be minor in most cases. Property owners would be compensated for the right of way taking and any damages to remaining property, in accordance with SCDOT policy and the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended.

The project would not adversely affect local government finances. Economic benefits to Horry and Georgetown Counties should result from the project because of continued access and efficient movement of tourists, local motorists and goods in the area. Efforts have been made to ensure that the proposed project will not change the general character of the area.

The proposed project was evaluated in accordance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations). According to 2005 – 2007 census data approximately 36.5% of the population of Georgetown County is minority and approximately 19.5% of the population of Horry County is minority. The project area is located in a rural portion of both counties. The Bucksport community, located near the northern portion of the project, has a population of approximately 1,117, based on the 2000 census. The per capita personal income for Georgetown County was $22,513 and the per capita personal income for Horry County was $23,829. The median family income for Georgetown County was $51,069 and the median family income for Horry County was $49,084. The Bucksport community is 97.8% minority (2000) with 20.9% of individuals below the poverty level, as compared to the overall Horry County figure of 12%. No specific census information was readily available for Yauhannah, located near the southern portion of the project. Based on the need to maintain a direct connection between the local communities, the project is not expected to specifically benefit, harm, or disproportionately impact any social group, including elderly, handicapped, non-drivers, minority, or ethnic groups.

Indirect Impact Analysis

The Federal Highway Administration (FHWA) and other Federal agencies' responsibility to address and consider direct, indirect, and cumulative impacts in the NEPA process was established in the Council of Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act[8] (40 CFR Parts 1500-1508). The CEQ regulations define the impacts and effects that must be addressed and considered by Federal agencies in satisfying the requirements of the NEPA process. The CEQ regulations note three impact categories; namely, direct, indirect, and cumulative. According to FHWA Guidance[9], the determination or estimation of future impacts is essential to both indirect and cumulative impact analysis.

Highway projects have both direct and indirect impacts on the environments in which they are located. The Council of Environmental Quality (CEQ) regulations state that direct effects are caused by the action and occur at the same time and place (40 CFR 1508.8). These on-site effects directly linked to the project action are highly predictable. For example, for a highway project, the action may be *right of way acquisition*, and the corresponding direct effect may be *displacement of local businesses*. Effects and impacts as used in the CEQ regulations are synonymous.

[8] Council of Environmental Quality. Executive Office of the President. Regulations for Implementing The Procedural Provisions of The National Environmental Policy Act.

[9] FHWA Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process.

According to the CEQ definition, indirect effects are caused by the action and occur later in time or further removed in distance, but still reasonably foreseeable (40 CFR 1508.8). For example, for a project action of *bypass highway*, the direct effect may be *improved access*, and the indirect effects may be *farmland converted to residential use*, and *new residences produce new labor force attracting new businesses*. Direct effects and indirect effects are linked in a causal chain. Indirect effects are by nature less certain than the direct effects, but are reasonably foreseeable. Direct effects may be predicted with a high degree of certainty. Indirect effects are possible consequences of an action. "Possible" in this instance means "likely", not just a remote possibility. Analysis of indirect effects must not be based on speculation, but it does require logical analysis of the likely effects of the proposed action. Effects that can be classified as possible but not as probable may be excluded from consideration.

The known and potential direct effects of the US 701 Bridge Replacement Project have been described in the previous sections of this document. This section of the document contains the Indirect Impact Analysis for this project. The above mentioned CEQ regulations and definitions were used to prepare the impact analysis.

Indirect Impacts

As mentioned earlier, Indirect Impacts are closely related to Direct Impacts. Indirect Impacts, like Direct Impacts, are those caused by the proposed action but occur later in time or are further removed, and may be adverse or beneficial. Indirect impacts are analyzed in this section of this document around the eight-step framework following the guidance provided in the National Cooperative Highway Research Program (NCHRP) Report 466[10], Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects (Report 466). Steps in the framework are as follows:

Step 1 – Initial Scoping for Indirect Effect Analysis
Step 2 – Identify Study Area Directions and Goals
Step 3 – Inventory Notable Features
Step 4 – Identify Impact-Causing Activities of Proposed Action and Alternatives
Step 5 – Identify Potentially Significant Indirect Effects for Analysis
Step 6 – Analyze Indirect Effects
Step 7 – Evaluate Analysis Results
Step 8 – Assess Consequences and Develop Appropriate Mitigation and Enhancement Strategies
Note: The above steps are iterative and may not necessarily be sequential.

Step 1 – Scoping

This step identifies the purpose and need for the project; identifies physical and ecological resource issues that affect the human environment; and, identifies potentially significant issues and effects for further analysis. This step also sets the appropriate boundaries for the analysis.

[10] NCHRP Report 466, Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects.

Purpose and Need – The purpose of the project is to replace the existing structurally deteriorated and functionally obsolete US 701 bridges and maintain a safe, principal direct rural connection between the larger towns of Conway and Georgetown, as well as the smaller communities such as Bucksport and Yauhannah in between. No additional traffic capacity in the way of travel lanes will be added by the project. The project would also include new embankment fill to support the roadway connecting the bridges and the approach roadways in Georgetown and Horry County, respectively. Replacement of these three existing bridges was determined urgent by the SCDOT and the FHWA considering the physical conditions of the existing structures,

Physical and Ecological Resource Issues – The project would result in certain modifications to the human and natural environment. The project corridor crosses the three water bodies, as well as extensive floodplain forested wetlands and traverses the Waccamaw National Wildlife Refuge (Refuge). The indirect impact analysis will consider resources, such as wetlands, water quality, threatened and endangered species, refuge and recreational areas, terrestrial and aquatic wildlife, and all other resources considered for direct impacts in Section IV of this EA. Full identification and consideration of these issues will be complete by the end of Step 5 of this framework.

Location and Extent of the Study Area – Indirect impacts are analyzed for resources of concern within particular geographic and temporal boundaries. This allows for the appropriate context to be developed for each resource. The Area of Influence (AOI) may vary from resource to resource. In general, the study area is 300 feet wide, and is centered on the existing US 701 alignment from a point near the US 701/ Trinity Road intersection in Georgetown County, to a point near the US 701/ Lucas Bay Road intersection in Horry County. However, the water bodies, wetlands, and floodplains within the project corridor are not isolated systems or singular resources. They are associated with the larger Great Pee Dee River/Winyah Bay Watershed, which is displayed in Figure 18. For the Hydrology and Floodplain Study, a field reconnaissance was conducted along the Great Pee Dee River from inside the North Carolina border to the north to Winyah Bay to the south.

Step 2 – Identifying Study Area Directions and Goals

The second step focuses on assembling information regarding general trends and goals within the study area. The trends and goals in question are independent of the proposed project and typically concern social, economic, ecological, and/or growth-related issues.

Goals – Any plans for the study area generally indicate the goals for the area. The study area is very rural and is dominated by the water bodies and wooded floodplain landscape. The Waccamaw National Wildlife Refuge occupies much of the study area. The Refuge was established in 1997 to preserve valuable undeveloped coastal wetland and adjacent uplands that provide habitats for many wildlife species. The stated objectives of the Refuge are:

- Provide habitat for waterfowl, shorebirds, wading birds, raptors, neo-typical migratory birds, and resident species;

- Environmental education and interpretations; and,

- Provide opportunities for hunting, fishing, and outdoor recreation.

On the Georgetown County side of the US 701 corridor, most of the study area is zoned Conservation Preservation District (CP). The area along the northwest side of the southwest portion of the study corridor is zoned Planned Development Unit (PD). The Georgetown County future land use map indicates the area around the Great Pee Dee River and Yauhannah Lake to be Conservation/Preservation and the area to the southwest of this to be Low Density Residential. The Georgetown County future land use map does not indicate any future significant development in the study area. On the Horry County side most of the project corridor is zoned Commercial Forest/Agricultural (CFA). At the northeastern end of the study corridor, small sections of land are zoned Residential District (MSF 10) and Highway Commercial District (HC). The residential portions contain single family homes. The Horry County future land use map does not indicate any future significant development in the study area.

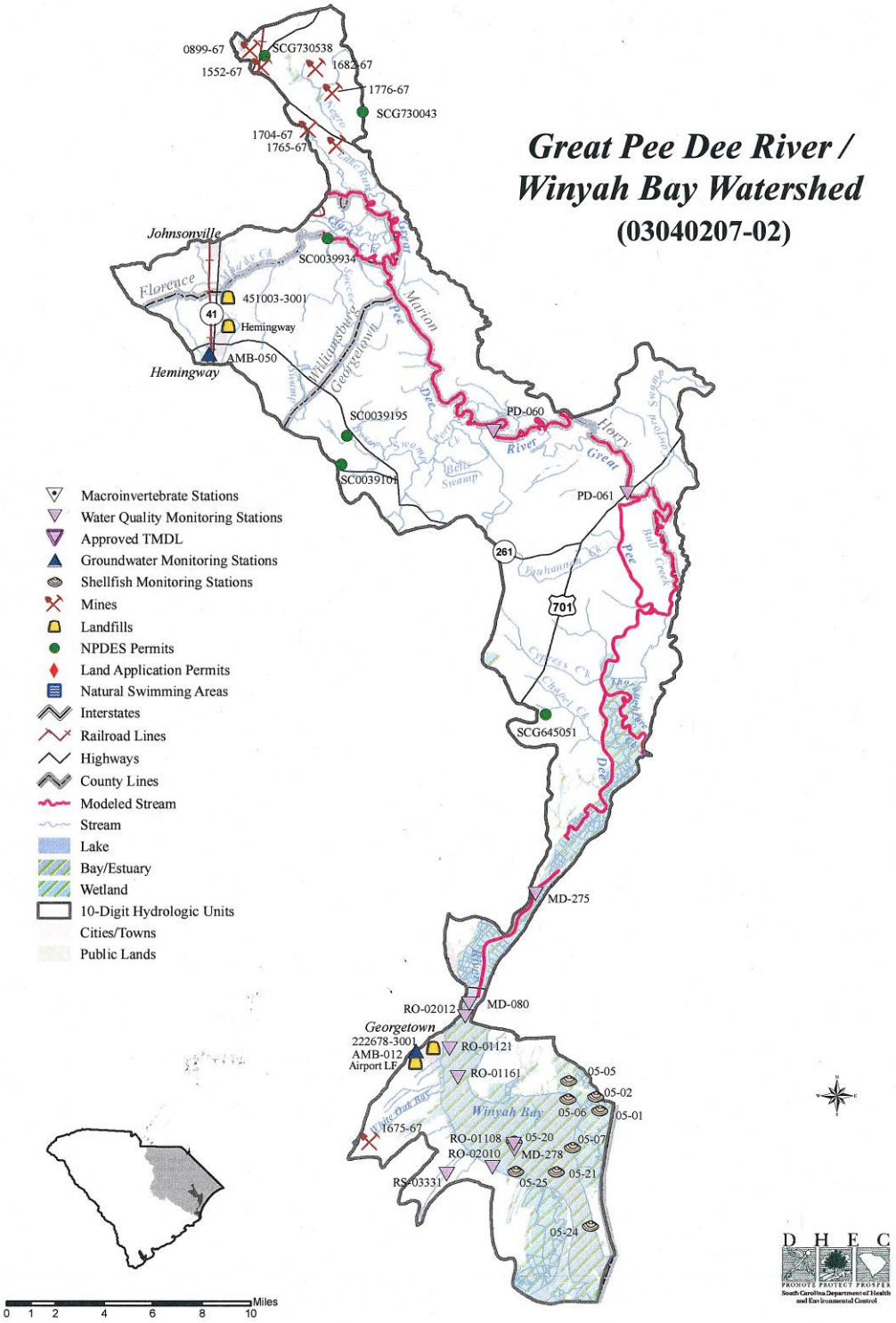

Great Pee Dee River /
Winyah Bay Watershed
(03040207-02)
0899-67
SCG730538
1552-67
1682-67
1776-67
SCG730043
1704-67
1765-67
Johnsonville
SC0039934
Florence
451003-3001
41
Hemingway
AMB-050
Hemingway
Williamsburg
Georgetown
Marion
SC0039195
PD-060
Horry
SC0039101
PD-061
261
701
SCG645051
MD-275
RO-02012
MD-080
Georgetown
222678-3001
AMB-012
Airport LF
RO-01121
RO-01161
05-05
05-02
05-06
05-01
Winyah Bay
1675-67
RO-01108
05-20
05-07
RO-02010
MD-278
05-21
RS-03331
05-25
05-24
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Shellfish Monitoring Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Bay/Estuary
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
0 1 2 4 6 8 10
Miles
D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

FIGURE 18

The Great Pee Dee River is a large water body. Most of the land bordering the river is forested floodplain. In addition to the US 701 Bridge, another bridge exists over the Great Pee Dee River carrying US 378, which is located approximately 21 miles upstream of the US 701 Bridge. There are no existing plans for construction of any other crossing within the study area.

Directions – The second part of this step is to identify the area's ongoing trends, which are referred to as "directions" in NCHRP Report 466. The Waccamaw National Wildlife Refuge is in an expansion and land acquisition trend. Presently the Refuge encompasses nearly 27,000 acres, and the proposed acquisition boundary spans over 55,000 acres.

The Grand Strand Water and Sewer Authority is currently planning an access road for the Bucksport Marine Industrial Park that will connect US 701 at the intersection with Old Pee Dee Road/Lucas Bay Road. This road would include an 800 foot long bridge over Cowford Swamp. See Figure 19.

The Southern Evaluation Lifeline (SELL) Project in Horry and Georgetown Counties is a proposed new location, multi-lane, controlled access roadway. See Figure 20 for the display. This project is not on SCDOT's priority list and will not be considered any further.

There are no other plans for further development in either Georgetown County or Horry County in the project area. Land use within the study area is stable.

Step 3 – Inventory of the Study Area's Notable Features

The primary objective of Step 3 is to inventory the base-line environmental conditions of the project area. This involves three sub-steps:

- Inventory Ecosystems Conditions;
- Inventory Socioeconomic Conditions; and,
- Inventory Notable Features.

The first two of the above mentioned sub-steps are conducted as part of establishing the existing conditions for analysis of direct effects. The resources considered in the first two sub-steps for the proposed US 701 Project are land use, farmlands, wetlands, river and water bodies, floodplains, water quality, noise, hazardous waste and underground storage tanks, and property relocations. The third sub-step is unique to the indirect impacts analysis.

The term "notable features" encompasses several other terms used. Some of these terms are:

- Sensitive Species and Habitats
- Valued Environmental Components
- Relative Uniqueness, Recovery Time, Unusual Landscape Features
- Vulnerable Elements of the Population

Map Provided by Thomas & Hutton, Myrtle Beach, SC

FIGURE 19

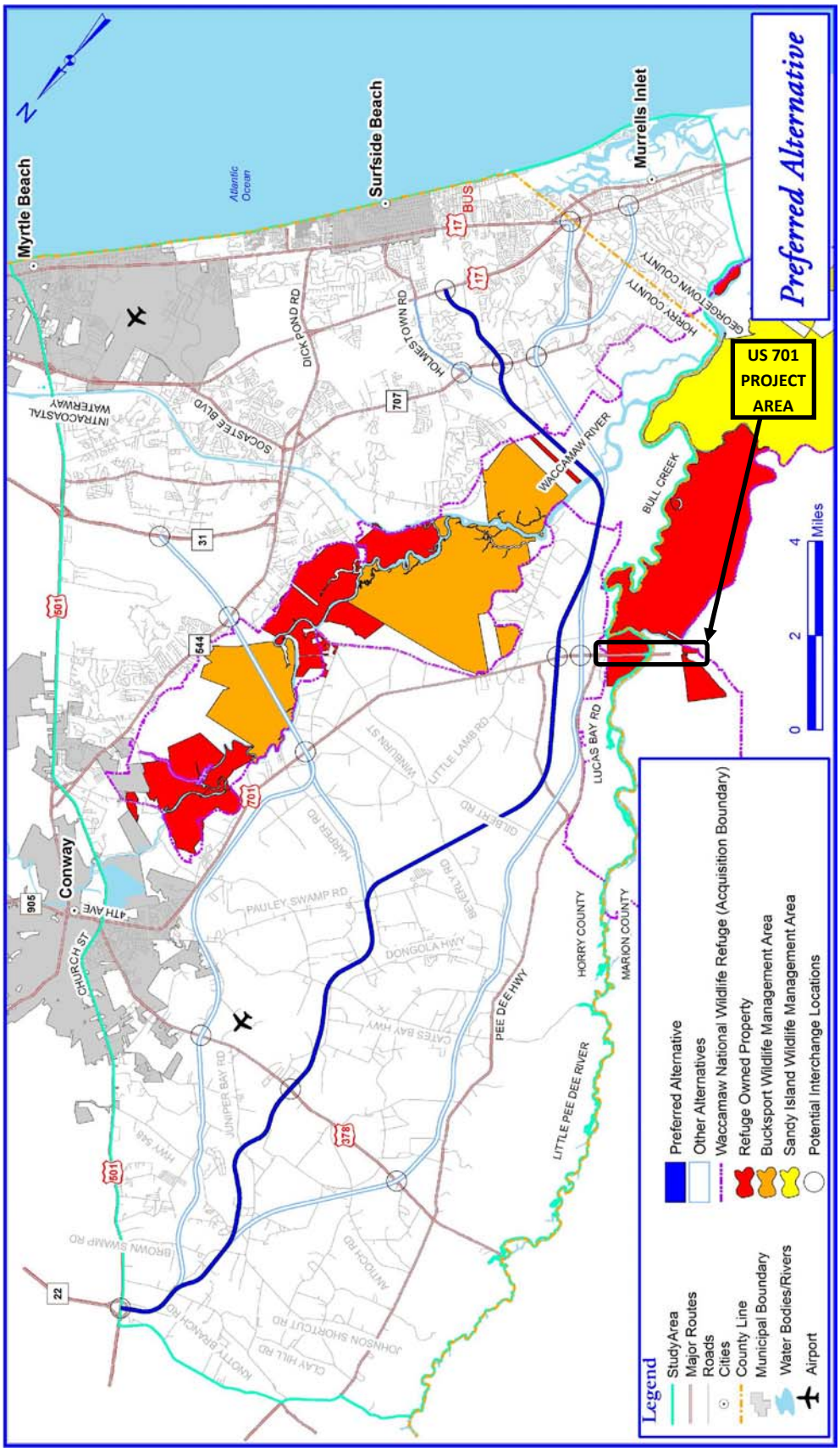


Figure provided by CECS, Inc. (SELL Project)

FIGURE 20

Sensitive Species and Habitats is a term used by the Environmental Protection Agency (EPA). This generally refers to ecologically valuable species and habitats, and /or those that are vulnerable to impacts. Rarity is considered a good indication of vulnerability. Sensitive Species and Habitats include State and Federally-listed threatened and endangered species and their habitats.

Valued Environmental Components are characteristics or attributes of the environment that society seeks to use, protect, or enhance.

Relative Uniqueness, Recovery Time, and Unusual Landscape Features measure the value of specific landscape elements according to several factors. Relative uniqueness refers to how many comparable examples of the element exist at different levels of scale. For example, a single oak tree in a large area of grassland is relatively unique in that grassland. The tree becomes more common among the general natural region, and even more common at the global scale. Recovery time refers to how long it would take to replace the landscape element if it were disturbed or destroyed. Landscapes which can be restored more quickly are less valuable than those requiring a long recovery time. Unusual landscape features are those that occur once, or only a few times, across a landscape. These features are valuable, and may represent particular activity centers. For example, a river passing through a landscape is a unique and important element of that landscape.

Vulnerable Elements of the Population may include the elderly, children, persons with disabilities, minority groups, or low income groups. These populations may be more susceptible to environmental conditions, or underrepresented in the decision-making process. These factors may also lead to these populations being less able to bear impacts and recover from them than the general population.

Based on the above discussion qualifying the “notable features”, the following resources of the proposed US 701 Project are identified under this category:

- NF-1: Water Resources (Sensitive Species and Habitats);
- NF-2: Biological Resources (Sensitive Species and Habitats);
- NF-3: Cultural Resources (Valued Environmental Components);
- NF-4: Public Recreational Facility (Valued Environmental Components); and,
- NF-5: Wildlife Refuge (Valued Environmental Components/ Sensitive Species and Habitats).

Summary of Step 3 – Step 3 above contains a list of inventory of Ecosystem Conditions, Socioeconomic Conditions, and Notable Features.

Step 4 – Identify Impact-Causing Activities of Proposed Action and Alternatives

Steps 2 and 3 of the indirect effects assessment framework identified the trends, goals, and notable features. Step 4 identifies the impact-causing activities. Step 5 identifies the potentially significant indirect impacts, while Step 6 analyzes the indirect effects.

Project impact-causing activities are relevant to two of the three types of indirect effects:

Encroachment – Alteration Effects – Effects that alter the behavior and functioning of the physical environment are related to project design features but are indirect in nature because they can be separated from the project in time or distance.

Access – Alteration Effects (Project-Influenced Induced Growth) – Changes in traffic patterns and the alteration of accessibility attributable to the design of the project can influence the location of residential and commercial growth in the study area.

The third type of indirect effect, ***Induced Growth – Related Effects*** are attributable to induced growth itself not project design features.

Impact causing activities include all of the activities involved in the project from clearing to maintenance of vegetation once the project is finished. These activities are relevant to encroachment-alteration effects and access-alteration effects. There are ten (10) general categories of impact-causing activities identified in NCHRP Report 466. These are listed below, with examples of each:

1. Modification of regime – alteration of habitat, flora, hydrology, etc.
2. Land transformation and construction – construction methods, design features, ancillary elements (i.e. parking lots, transit shelters, etc.)
3. Resource extraction – excavation, dredging
4. Processing – storage of construction materials
5. Land alteration – erosion control, landscaping, fill
6. Resource renewal activities – revegetation, remediation activities
7. Changes in traffic – traffic patterns on project and adjoining facilities
8. Waste emplacement – landfill, waste discharge
9. Chemical treatment – fertilization, herbicide application, deicing
10. Access alteration – changes in access, circulation patterns, travel times to major attractions

The proposed project would involve realignment of approximately a two-mile long section of US 701, replacing three bridges and placing connecting roadways on embankment fills. It would include the following impact-causing activities. Construction access would be provided which may cause some temporary impact. New fill would be placed in the wetlands. The existing bridges and the abandoned concrete piers in the Great Pee Dee River from the 1920's construction will be removed.

The project would also include relocating the Yauhannah Boat Landing in Horry County and providing a safe and improved access road for the boat landing facility to and from US 701. The realigned US 701 would encroach into the Waccamaw National Wildlife Refuge. A left turn lane would be added on US 701 leading to the entrance of the Waccamaw National Wildlife Refuge Visitor's Center. The addition of a turn lane would address an existing safety issue at the Center's entrance.

Impact-causing activities are described by type in Table 6 below:

Table 6: Impact Causing Activities

Type of Activity	**Project Specific Activity**	**Relevant Details**
Modification of Regime	Modification of Habitat	Wooded floodplain habitat would be temporarily modified due to the need for temporary construction access. No permanent habitat alteration is anticipated.
Modification of Regime	Alteration of Ground Cover	Ground cover adjacent to the alignment will be temporarily disturbed. Best Management Practices will be in place to control soil erosion. When construction is complete, ground cover will be reestablished with a similar species composition to that currently present.
Modification of Regime	River Control and Flow Modification	After the proposed bridge is constructed, the existing bridge including the substructure units can be removed. Additionally the two leftover piers from the 1920's bridge can also be removed. This would improve the river flow and prevent debris collection on the upstream side, thus helping the channel habitat.
Land Transformation and Construction	New or Expanded Transportation Facility	The existing bridges carry one 12' lane and one 2'6" sidewalk in each direction. The proposed bridge would carry one 12' lane and one 10' shoulder in each direction. This would provide safer driving conditions for the traveling public. This would also create 1.83 acres of additional impervious surface.

Type of Activity	Project Specific Activity	Relevant Details
Modification of Regime	Modification of Habitat	Removal of the existing bridges will remove the roosting structure for Rafinesque's big eared bat. The new bridges will be similar and will provide new roosting structures.
Modification of Regime	Modification of Habitat	Demolition of the existing bridges may interfere with nesting for barn swallow. Seasonal moratorium on demolition will limit interference with nests.

Step 5 – Identify Potentially Significant Indirect Effects for Analysis

The objective of this step is to compare the list of project impact-causing actions with the lists of goals and notable features to explore potential cause-effect relationships and establish which effects are potentially substantial and merit subsequent detailed analysis (or conversely, which effects are not potentially substantial and require no further assessment). Based upon the information provided in the previous steps, the indirect effects may be identified. This step is essentially a screening step; only those impacts which may be substantial require further analysis. The context of the Area of Influence and the intensity of the impact should be considered when determining if an impact may be substantial. Each type of indirect effect should be considered for relevance to the project. As explained in Step 4, the types of indirect effects include:

- Encroachment-Alteration Effects;
- Induced Growth Effects; and,
- Effects Related to Growth.

The following potential indirect effects were identified, and each was examined to determine if it was substantial or not:

A) Encroachment-Alteration Effects

Encroachment-Alteration Effects may occur in two categories: i) ecological effects, and ii) socioeconomic effects. Encroachment-Alteration Effects are linked to the impact-causing activities identified in the previous step.

i) Ecological Effects

Land Use – The proposed action could result in indirect impacts on Land Use by providing improved transportation amenities along the corridor which could facilitate additional development in this area. Projects influencing changes in regional access and mobility also induce changes in development and land use patterns. Such secondary effects could result in indirect impacts to the

social and human environment as well as to natural resources affected by new development patterns.

As identified in Report 466, Course Module 1, Figure 1-3, these types of projects include new highways, highway extensions, bridges to currently undeveloped areas, highway bypasses, and similar. Report 466, Course Module 7 summarizes such projects as falling into three overall categories:

- Projects planned to serve specific land development;
- Projects likely to stimulate complementary development; and,
- Projects likely to influence interregional locational decisions.

The US 701 Project is not intended to increase capacity, but rather to replace an existing two-lane facility with a similar, adjacent two-lane facility with reconnection points with the US 701 approach roadways approximately at the same locations. The proposed project would not increase highway capacity or alter regional access. The new alignment would not include any new access points. Therefore, the project should not change the character of the surrounding environment, induce development, or facilitate a change in the pattern of land use along the corridor. For this reason, indirect impacts on Land Use will not be evaluated further.

Air Quality – The proposed US 701 Project would not increase the traffic capacity. Air quality would have no appreciable change compared with the no-build condition. Indirect impacts on Air Quality will not be evaluated further.

Noise – The proposed project would not increase the number of travel lanes. Noise level would have no appreciable change compared with the no-build condition. Indirect impacts on Noise will not be evaluated further.

The above resources under the category of "Ecological Effects" will not be evaluated any further for indirect effects. However, several Notable Features were identified in Step 3 and would have potential to receive indirect impacts. The following Notable Features merit further examination in Steps 6 through 8:

- NF-1: Water Resources (Sensitive Species and Habitats);
- NF-2: Biological Resources (Sensitive Species and Habitats);
- NF-3: Cultural Resources (Valued Environmental Components);
- NF-4: Public Recreational Facility (Valued Environmental Components); and,
- NF-5: Wildlife Refuge (Valued Environmental Components/ Sensitive Species and Habitats).

ii) Socioeconomic Effects

The proposed project would not have any effects on land use, or cause any changes in the residential areas. Indirect impacts on Socio-Economic resources will not be evaluated further.

B) Induced Growth Effects

As mentioned earlier, the US 701 Project is not intended to increase capacity, but rather to replace an existing two-lane facility with a similar, adjacent two-lane facility with reconnection points with the US 701 approach roadways approximately at the same locations. The new alignment would not include any new access points. Therefore, the project should not change the character of the surrounding environment, induce development, or facilitate a change in the pattern of land use along the corridor. Induced Growth Effects will not be studied any further.

C) Effects Related to Induced Growth

None

Summary of Step 5 – Potential exists for several resources identified under "Notable Features" to have substantial indirect impacts. These resources merit further examination using Steps 6 through 8.

Step 6 – Analyze Indirect Effects

Potential indirect effects are anticipated on several resources under the identified "Notable Features." Each of these substantial indirect effects is further analyzed below. All of these indirect impacts fall under the category of "Encroachment-Alteration Effects", and the resources are under the "Notable Features".

NF-1 – Water Resources

Water Quality – The project would involve work within the Great Pee Dee River, Yauhannah Lake, and the forested wetlands associated with these water bodies, as well as wetlands associated with Great Pee Dee River overflow. Impacts from the proposed project construction could include increased sedimentation and siltation, changes in light incidence and water clarity due to increased sedimentation and vegetation removal. After the construction of the proposed project and removal of the existing US 701 pavement, the project would increase the impervious surface by 1.83 acres. Runoff may be increased due to increased impervious surface area, but vehicle related contaminants in the runoff would not increase due to having the same number of traffic lanes as existing. In addition, the deck runoff over the width of the Great Pee Dee River would be collected; and, unlike the existing bridge deck drainage, the runoff would not be discharged into the Great Pee Dee River directly from the bridge deck. Through the implementation of Construction Best Management Practices (BMPs) reflecting policies contained in 23 CFR 650 B and S. C. Code of Regulations 72-400, other erosion control methods necessary to curtail runoff during construction, the use of SCDOT designated seeding techniques, and the fact that vehicular traffic should not significantly increase above the "no build" alternative; there should not be any potential indirect impacts on Water Quality from the proposed project.

Wetlands – As the proposed project would traverse the water bodies, floodplains and wetlands, wetland impacts would be unavoidable. Alternative 3 (55 feet downstream) would have the least wetland area impact (8.55 Acres). The wetlands impacted are considered to be palustrine forested floodplain wetland, characterized as Resource Category 3, according to USFWS resource category criteria.

Alternative 2 (55 feet upstream) would result in approximately 1.25 acres greater permanent wetland impacts than Alternative 3. However, based on a field analysis and observations conducted by biologists from the SCDOT and the US Fish and Wildlife Service, the wetlands impacted by Alternative 2 are of a lesser quality due to an old road bed running along the upstream side of the bridge. This road bed has resulted in less potential biomass due to observations of lower populations of mature obligate wetland plant species in the floodplain. In addition, the nearby regularly maintained power line right of way keeps a large swath of wetland on the upstream side in an unnatural immature palustrine emergent wetland state. This marsh-type environment has a significantly different and less diverse biotic community than the primarily palustrine forested wetland and palustrine unconsolidated bottom wetland communities on the downstream side of the existing bridge.

Reclamation of wetland areas temporarily lost through construction activities would involve returning disturbed areas to their original elevations to the extent practicable, allowing for adjacent vegetation to naturally reclaim the area.

The proposed project will require an individual Corps of Engineers Section 404 permit, Section 401 Water Quality Certification, and an Ocean and Coastal Resource Management (OCRM) Coastal Zone Consistency Certification.

NF-2 – Biological Resources

Examples of potential indirect effects on biological resources could include:

- Loss of vegetation and wildlife habitat by the proposed project if the roadway improvements encouraged or influenced an increase in development in the study area.
- Effects to aquatic species due to pollutant loading from hazardous materials contamination in the study area from any development induced by the proposed improvements.

- Loss of vegetation and wildlife habitat would be an example of a potential indirect impact from roadway improvements. Specifically, wildlife habitat could be indirectly impacted by the proposed project if the roadway improvements encouraged or influences an increase in development in the study area.

The following discusses the potential indirect effects on biological resources for the proposed US 701 project:

Threatened or Endangered Species

A number of threatened or endangered species are known to exist in the project corridor, and are discussed below.

Shortnose sturgeon and Atlantic sturgeon

It is known that the endangered Shortnose sturgeon (*Acipenser brevirostrum*) and the endangered Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) begin spawning migration to the freshwater of the Great Pee Dee River during late winter into early summer. There would be in-water construction for the proposed project. None of the listed species were observed during field surveys. It is known that the sturgeon does exist in the Great Pee Dee River. The Department has agreed to implement a seasonal moratorium for all in water work between January 1 and April 15. In-water work is defined as any activity (e.g. excavation, fill, pile driving, drilled shaft construction) that could result in the physical destruction or alteration of important spawning habitats. During the moratorium, the contractor would be allowed to work from a barge in order to construct columns, caps, and bridge superstructure. The contractor would be allowed to move barges between shafts during the moratorium; however, barges must be secured by cables as placement of spuds to secure barges will not be allowed during the moratorium. Equipment and materials used during the construction of the bridge will not obstruct or impede passage through more than 50 percent of the channel. This restriction will allow the migratory pathway to remain open while both shortnose sturgeon and Atlantic sturgeon are likely to be migrating. Pursuant to Section 7 of the Endangered Species Act (ESA), the SCDOT requested informal consultation from the NOAA Fisheries regarding potential impacts to the Shortnose sturgeon and the Atlantic sturgeon associated with this proposed US 701 bridge replacement project. The NOAA Fisheries offered concurrence of the SCDOT's determination that the project may affect, but is not likely to adversely affect the endangered Shortnose sturgeon and the Atlantic sturgeon. Please see attached correspondence located in the Appendix B, Pages B-38 and B-40.

Terrestrial and Other Aquatic Wildlife

A review of the SCDNR Heritage Trust Inventory of Rare, Threatened and Endangered Species has indicated that the Rafinesque's big eared bat (*Corynorhinus rafinesquii*) has been known to occur beneath the Great Pee Dee River Overflow Bridge and the Yauhannah Lake Bridge. In a letter dated February 14, 2005 (See the Appendix B, Page B-161), SCDNR stated that two colonies of Rafinesque's big eared bat were observed roosting under the US 701 bridges proposed for replacement. At a May 2, 2008 meeting with the Department in Columbia, South Carolina, the Refuge Manager also provided information, in the form of his e-mail communications with bat researchers, that two groups of bats were observed beneath the Yauhannah Lake Bridge in 2002. One colony was a maternal colony of 21 individuals. The maternal colony used the bridge again in 2003.

The Rafinesque's big eared bat is not a Federally listed threatened or endangered species; however, the bat is rare in South Carolina and is considered a State endangered species.

Removal of the existing bridges will remove these roosting structures; however, the existing bridges will not be removed until the new bridges are constructed, and the new bridges will provide new roosting structures. Construction of the new bridges may create a temporary disturbance to the bats utilizing the existing structures; however, according to information from Bat Conservation International (BCI), bats roosting in bridges become accustomed to vibrations and sound associated with normal traffic. Structural maintenance may have an effect only if the bats are exposed or if foreign materials are introduced. BCI researchers have observed crews working on and around bat occupied structures with no apparent effects[11].

The bats prefer large, concrete-girder bridges and avoid flat bottomed slab bridges[12]. The proposed bridges over the Great Pee Dee River Overflow and Yauhannah Lake will be of concrete girder construction and will have longer spans than the existing bridges providing more roosting habitat than currently available. As the design of the new bridges will be conducive to roosting, impacts to roosting habitat will be temporary and subsequently improved.

The swallow tailed kite (*Elanoides forficatus*) is a Federal species of concern and State endangered species, which is also known to exist in the vicinity of the project corridor. According to information provided by the Refuge Manager, as documented in the Natural Resources Summary Report, the kite is known to use the wooded swamp around Cowford Lake (to the southeast of the existing US 701 alignment) as a nesting area. Additional information provided by the Refuge Manager has indicated various kite sightings in the vicinity of the existing US 701 alignment as well as being scattered throughout the refuge area.

The kite is known to use the wooded swamp around the southeastern side of Cowford Lake on the southeastern side of the existing US 701 alignment. Two occurrences of kite nesting have been documented further to the northwest of the existing alignment. The closest of these occurrences is located approximately 3,000 feet northwest of the existing alignment. By keeping the proposed alignment closer to the existing alignment, potential impacts to the kite habitat will be minimized.

During field reviews, SCDOT biologists noticed the nests of barn swallows (*Hirundo rustica*). Since they were found to be nesting on the bridge, in conformity with the Migratory Bird Treaty Act of 1918, no demolition of the existing bridge will take place during the nesting season of the barn

[11] Keely, B.W. and M.D. Tuttle, 1999. Bats in American Bridges. Bats Conservation International, Inc. Resource Publication No. 4

[12] Bennett, Frances M., Susan Loeb, Mary S. Bunch, and William W. Bowerman. 2008. Use and Selection of Bridges as Day Roots by Rafinesque's Big-Eared Bats. The American Midland Naturalist. 160:386-389

swallow (approximately mid-May through August). SCDOT will survey the nests to be sure that the nests are abandoned prior to demolition.

The other existing bridges over the Great Pee Dee River system in this area include US 378 Bridge, located approximately 24 miles to the northwest, and the US 378 Bridge over the Little Pee Dee River, located approximately 13 miles northwest, and the US 17 Bridge over the Waccamaw River, located approximately 21 miles to the south-southwest. At the US 701 bridging and causeways, the bottomland forest and swamp habitat continues relatively uninterrupted for many miles upstream and downstream, providing habitat for a number of species. No other notable impacts to wildlife are expected. Longer bridging, combined with removal of some of the existing causeway fill, and removal of existing bridge piers from the 1920s construction will permit greater opportunity for wildlife passage. Through the use of BMPs, other erosion control methods necessary to curtail runoff during construction, and the use of SCDOT designated seeding techniques; there should be no substantially increased impact on water quality in the area as a result of this project. Therefore, major impacts to aquatic wildlife are not expected.

NF-3 – Cultural Resources

The proposed construction would take place in close proximity of Archeological Site 38GE18. The construction would be limited to the previously disturbed area of the site. The SCDOT has determined that the proposed project would not have adverse impacts on cultural resources through the Section 106 process with concurrence from the SHPO/THPO. The SCDOT has made commitments that monitoring of this site will be performed by one of SCDOT's archeologists during ground disturbing activities. Also, personnel from SHPO, the Catawba Indian Nation THPO, and USFWS Regional Historic Preservation Officer will be informed of these monitoring activities and afforded an opportunity to be present on-site if desired. Any late archeological manifestations are discovered, reports will be made to SHPO, the Catawba Indian Nation THPO, and USFWS Regional Historic Preservation Officer. SCDOT's commitments also include that if any significant portions of the site are encountered, construction activities in that area will be halted and it will be treated as a late discovery

NF-4 – Recreational Facility

One public recreation area exists within the project study area. The Horry County public boat landing is located beneath the existing US 701 Great Pee Dee River Bridge. The boat landing is used by Horry and Georgetown County residents, as well as persons from outside the general area, for recreational boating and fishing opportunities. Based on evaluations of conceptual alternative alignments, several alignments would result in unavoidable impacts to the boat ramp facility in varying degrees. Placing the alignment 55 feet upstream of the existing Great Pee Dee River Bridge would require the removal and relocation of the current boat ramp. The existing US 701 alignment will remain open to traffic during construction of the new bridges. SCDOT commits to keep the existing or the relocated boat ramp

accessible during construction to the extent it is possible and safe to do so. Please see the letter located in the Appendix B, Page B-113 with concurrence with SCDOT's findings from the Horry County office with jurisdiction over the property. Construction activities would not impede movements of appropriate recreational watercrafts in the Great Pee Dee River.

NF-5 – Wildlife Refuge

A major portion of the project corridor traverses the Waccamaw National Wildlife Refuge, which in the area of the corridor, is predominantly forested wetland. The proposed project would encroach into the refuge property.

Step 7 – Evaluate Analysis Result

Step 5 included the identification of resources that would not have any substantial indirect impacts from the proposed project. Step 5 also identified several Notable Features, and Step 6 included the analysis of indirect impacts of the resources under each Notable Feature. Step 7 summarizes and evaluates the analysis performed in the above mentioned steps for potential indirect effects. The following, Table 7, indicates the precautionary measures to be undertaken and the needs for permits and certification:

Table 7: Possible Indirect Effects and Precautions/Solutions

Resources	**Possible Indirect Effects**	**Precautions/ Solutions**	**Permits/Certification/ Concurrence**
Water Quality	Increased Sedimentation and Siltation: Increased Erosion; Increased Pollutant Discharge	Construction BMP's; Erosion and Sediment Control Measures	SCDHEC Section 401 Permit
Wetlands	Discharge of Fill Material; Wetland Encroachment	Compensatory Mitigation (See Step 8)	USACE Section 404 Permit; OCRM Coastal Zone Consistency Certification
Shortnose sturgeon	Spawning Migration	Seasonal Construction Moratorium	Consultation with NOAA Fisheries and Concurrence

Resources	Possible Indirect Effects	Precautions/ Solutions	Permits/Certification/ Concurrence
Atlantic sturgeon	Spawning Migration	Seasonal Construction Moratorium	Consultation with NOAA Fisheries and Concurrence
Rafinesque's big eared bat	Loss of Roosting Structures (Exist. Bridges)	New Roosting Structures (New Bridges)	
Barn swallow	Interference w/ nesting under exist. bridges	Seasonal moratorium for bridge demolition activities.	
Archeological Site 38GE18	Disturbance During Construction/ Late Discovery	Monitoring, Reporting to SHPO/THPO/ USFWS	Section 106 Consultation and Concurrence
Horry County Boat Landing	Removal, Partial Loss of Public Use	Compensatory Mitigation (See Step 8)	Consultation with Horry Co. and Concurrence
Waccamaw Wildlife Refuge	Right of Way Encroachment	Compensatory Mitigation (See Step 8)	Consultation with USFWS

Step 8 – Assess Consequences and Develop Appropriate Mitigation and Enhancement Strategies

The three US 701 bridges over Yauhannah Lake, the Great Pee Dee River, and Great Pee Dee River Overflow, respectively, must be replaced. The existing bridges are structurally deteriorated and functionally obsolete. Replacement of these bridges was determined urgent by the SCDOT and the FHWA considering their physical conditions. The proposed project would result in beneficial impacts on the safety of the travelling public.

Step 7 included an evaluation of the results of the indirect impact analysis. Mitigation was considered for those indirect impacts which were determined to be substantial. This step develops appropriate mitigation and enhancement strategies.

Wetland Encroachment – Approximate permanent wetland impact for this Alternative 3 is 8.55 acres. Alternative 2 (55 feet upstream) has a permanent wetland impact of 9.47 acres. However, based on a field analysis and

observations conducted by biologists from the SCDOT and the US Fish and Wildlife Service, the wetlands impacted by Alternative 2 would be of a lesser quality due to an old road bed running along the upstream side of the bridge. This road bed has resulted in less potential biomass due to observations of lower populations of mature obligate wetland plant species in the floodplain. In addition, the nearby regularly maintained power line right of way keeps a large swath of wetland on the upstream side in an unnatural immature palustrine emergent wetland state. This marsh-type environment has a significantly different and less diverse biotic community than the primarily palustrine forested wetland and palustrine unconsolidated bottom wetland communities on the downstream side of the existing bridge. Alternative 2 has been selected as the preferred alternative. It appears that there is no practicable alternative to the proposed new construction in the wetland areas.

SCDOT, in coordination with USFWS, will follow the Corps of Engineers SOPs to locate and acquire an appropriate property that will generate the compensatory mitigation credits required to compensate for unavoidable impacts associated with the proposed bridge replacements.

Horry County Public Boat Landing – Alternative 2 alignment will necessitate the removal and relocation of the boat landing. The boat landing access road system would be relocated too. The SCDOT proposes to include the removal and relocation of the current boat ramp in the proposed project. The SCDOT also recognizes that Horry County would like to be involved in the development of the design and layout of the boat landing area, and the SCDOT will continue to coordinate with Horry County's engineering staff to be sure that proper input is obtained. Horry County Administrator has concurred with SCDOT proposed action. The proposed project would provide an enhanced boat landing facility with safe access roads to and from US 701.

Waccamaw Wild Life Refuge –

See Section 4(f) Programmatic Evaluation included in Appendix B for details of mitigation.

Cumulative Impacts Analysis

According to the CEQ definition (40 CFR 1508.7), cumulative impacts are impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions[13]. Cumulative impacts can result from individually minor but collectively significant actions

[13] Council of Environmental Quality. Executive Office of the President. Regulations for Implementing The Procedural Provisions of The National Environmental Policy Act.

taking place over a period of time. The cumulative impact analysis builds upon information derived from the direct and indirect impacts analyses.

The evaluation process for each resource can be summarized as follows:

BASELINE CONDITION + PROJECT IMPACTS + FUTURE EFFECTS
(Historical and Current) (Direct and Indirect) (Reasonably Foreseeable)
= CUMULATIVE IMPACTS.

NCHRP Report 466[14] provides the following table showing a summary of the distinction between direct, indirect, and cumulative effects.

Table 8: Direct, Indirect and Cumulative Impacts

Type of Effect	Direct	Indirect	Cumulative
Nature of Effect	**Typical/Inevitable/ Predictable**	**Reasonably Foreseeable/ Probable**	**Reasonably Foreseeable/ Probable**
Cause of Effect	**Project**	**Projects Direct and Indirect Effects**	**Projects Direct and Indirect Effects and Effects of Other Activities**
Timing of Effect	**Project Construction and Implementation**	**At Some Future Time than Direct Effect**	**At Time of Project Construction or In the Future**
Location of Effect	**At the Project Location**	**Within Boundaries of Systems Affected by the Project**	**Within Boundaries of Systems Affected by the Project**

Cumulative Impacts were analyzed in general accordance with the requirements of the Council on Environmental Quality (CEQ). The following eight steps serve as guidelines for identifying and assessing cumulative impacts:

Step 1 – Identify the Resources to Consider in the Analysis
Step 2 – Define the Study Area for Each Resource
Step 3 – Describe the Current Health and Historical Context for Each Resource
Step 4 – Identify Direct and/or Indirect Impacts of the Proposed Project that Might Contribute to a Cumulative Impact
Step 5 – Identify Other Reasonably Foreseeable Actions that May Affect Each Resource
Step 6 – Assess Potential Cumulative Impacts to Each Resource

[14] NCHRP Report 466, Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects.

Step 7 – Report the Results
Step 8 – Assess and Discuss Mitigation Issues for all Adverse Impacts

Step 1 – Identify the Resources to Consider in the Analysis

If a project will not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on the resource. The cumulative impact analysis should focus only on: 1) those resources significantly impacted by the project; and, 2) resources currently in poor or declining health or at risk even if the project impacts (either direct or indirect) are relatively small (less than significant). The determination of whether a resource is in poor or declining health is based on information gathered for the analysis of direct and indirect impacts, particularly trend data gathered in Step 2 of the indirect impact analysis.

The proposed US 701 Project may have potential direct and indirect impacts (both significant and not significant) to the following resources:

- Threatened and Endangered Species;
- Water Quality;
- Wetlands;
- Terrestrial and Aquatic Wildlife;
- Archeological Site 38GE18;
- Waccamaw National Wildlife Refuge; and,
- Horry County Public Boat Landing.

All of the resources listed above should be considered to begin the cumulative impact analysis.

Step 2 – Define the Study Area for Each Resource

Step 2 defines a specific Resource Study Area (RSA) for each resource to be analyzed. A watershed represents a bounded hydrologic system where natural resources such as surface water and wildlife are interconnected and integrated. For wetlands and wildlife habitats, the Great Pee Dee River/Winyah Bay Watershed is identified as the Resource Study Area. See Figure 18. Transportation project growth in the foreseeable future will be considered over an extended area covering Georgetown, Horry and other adjoining counties. The study area for Historic Site 38GE18, Waccamaw National Wildlife Refuge, and Horry County Public Boat Landing is 300 feet wide, and is centered on the existing US 701 alignment. A cumulative impact analysis should be based on a geographic study area for each resource as well as a time frame. A “future” action of twenty years has been established for the cumulative impact analysis based upon the trend in changes in the area.

Step 3 – Describe the Current Health and Historical Context for Each Resource

Step 3 describes: a) the current health, condition, or status of a resource; and, b) provides historical context regarding how the resource got to its current state.

The proposed US 701 Project would replace three existing bridges over the Great Pee Dee River, the Great Pee Dee River Overflow, and Yauhannah Lake, respectively. The proposed project would also realign the roadways connecting the bridges. These roadway sections would be built on embankments. The existing bridges were built in the early 1950's and replaced the older bridges which were located in an adjacent alignment downstream of the current alignment. The older bridges were constructed circa 1920. The existing bridges would be demolished upon completion of the proposed construction.

The following describes the current health and historical context for the resources.

Water Resources

Water Quality – At the US 701 Bridge crossing, the water has a classification of FW (Freshwater), which is defined as freshwater suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with SCDHEC requirements. Previously, the Great Pee Dee River above the US 701 Bridge was listed by SCDHEC as State impaired water for the purposes of fish consumption due to mercury contamination under Section 303(d) of the Clean Water Act (2004-2008 listing). However, the recent data shows that aquatic life uses are fully supported.

Wetlands and Wetland Habitats – The wetland habitat of the Great Pee Dee River system in this area has been partially fragmented due to the construction of the original US 701 causeway in the 1950's. There is an old road bed running along the upstream side of the existing bridge. This road bed has resulted in less potential biomass due to observations of lower populations of mature obligate wetland plant species in the floodplain. In addition, the nearby regularly maintained power line right of way on the upstream side of the existing bridge, keeps a large swath of wetland on the upstream side in an unnatural immature palustrine emergent wetland state. The marsh-type environment has a significantly different and less diverse biotic community than the primarily palustrine forested wetland and palustrine unconsolidated bottom wetland communities on the downstream side of the existing bridge.

Biological Resources

Threatened and Endangered Species – The Shortnose sturgeon was first listed as Federally Endangered in 1967 under the Endangered Species Preservation Act of 1966. The Atlantic sturgeon was first listed as Federally Endangered in 2012 under the Endangered Species Act (ESA). It is known that the Shortnose sturgeon and the Atlantic sturgeon begin spawning migration to the freshwater of the Great Pee Dee River during late winter into early summer. The water quality of the Great Pee Dee River supports this spawning migration.

Terrestrial and Other Aquatic Wildlife – The current environment supports the existence of the Rafinesque's big ear bat, the swallow tailed kite, and several other bird species, amphibians and reptiles.

Cultural Resources

The archeological site 38GE18 is located in proximity of the current US 701 alignment. Although a portion of 38GE18 as it exists within the project study corridor has been severely damaged or destroyed, the 20 foot wide strip on US Fish and Wildlife property is intact and contributes to the eligibility of the site as a whole to the National Register of Historic Places.

Recreational Facility

The Horry County Boat Landing, also known as the Yauhannah Boat Landing, is located beneath the Great Pee Dee River Bridge on the Horry County bank of the river. It is located just upstream of the bridge. It is a popular facility and is frequently used. The facility provides parking areas for vehicles and trailers. Access roads to and from the boat landing are substandard which creates safety concerns for users.

Wildlife Refuge

The Waccamaw National Wildlife Refuge (Refuge) was established in 1997 with the purposes to (1) protect and manage diverse habitat components within an important coastal river ecosystem for the benefit of endangered and threatened species, freshwater and anadromous fish, migratory birds, and forest wildlife, including a wide array of plants and animals associated with bottomland hardwood habitats; and, (2) provide compatible wildlife-dependent recreational activities including hunting, fishing, wildlife observation, photography, and environmental education and interpretation for the enjoyment of present and future generations. The Refuge currently contains approximately 27,000 acres and its proposed acquisition boundary spans over 55,000 acres. In order to enter the Refuge Visitors Center, vehicles must wait on the southbound lane of US 701 until there is a break in oncoming traffic. This is not a safe situation considering the current location of the entrance road and the high speed southbound traffic coming off the bridge.

Step 4 – Identify Direct and/or Indirect Impacts of the Proposed Project that Might Contribute to a Cumulative Impact

The probable direct and indirect impacts arising out of the proposed US 701 Project include encroachment into wetlands, construction in the river and floodplains, and use of wildlife refuge property. The probable impacted resources are as follows:

- Water Quality;
- Threatened or Endangered Species;
- Wetlands;
- Terrestrial and Aquatic Wildlife;

- Historic Site 38GE18;
- Waccamaw National Wildlife Refuge; and,
- Horry County Public Boat Landing.

The following step (Step 5) identifies the other reasonably foreseeable actions that may affect the above resources. Step 6 assesses the potential cumulative impacts to each resource.

Step 5 – Identify Other Reasonably Foreseeable Actions that May Affect Each Resource

The potential/foreseeable actions in the project area are discussed below.

The Southern Evacuation Lifeline (SELL) Project, Horry and Georgetown Counties

The SELL Project is a proposed new location, multi-lane, controlled access roadway extending from US 17 or SC 31 in southeastern Horry County or northeastern Georgetown County to the US 501 and SC 22 (Veteran's Highway) interchange (northwest of Conway) in Horry County[15]. SCDOT, in partnership with FHWA, is responsible for this project. The display of the preferred alternative for the proposed SELL Project is included in Figure 21.

It appears that this project is not on SCDOT's priority list, and it may not be executed within the 20 year time frame of this evaluation. So, the project does not fall under "reasonably foreseeable actions", and will not be included in the cumulative impact analysis.

US 701 Widening

Georgetown County's Transportation Master Plan indicates the widening of US 701 from SC 51 north to the Georgetown/Horry County line and on towards Conway as a project in the 2030 GSATS LRTP (#20)[16]. The document also mentions that the length of the project (35 miles) and cost (estimated in 2004 at $170 million) prohibit implementation, other than a phased project over time. The project may not be probable within the next 20 years. Therefore, this project is not categorized under "reasonably foreseeable actions", and will not be included in the cumulative impact analysis.

[15] Draft Environmental Impact Statement, Southern Evacuation Lifeline, Horry and Georgetown Counties, August 2008

[16] Georgetown Countywide Transportation Master Plan, Final Report. By Wilbur Smith Associates, 2007

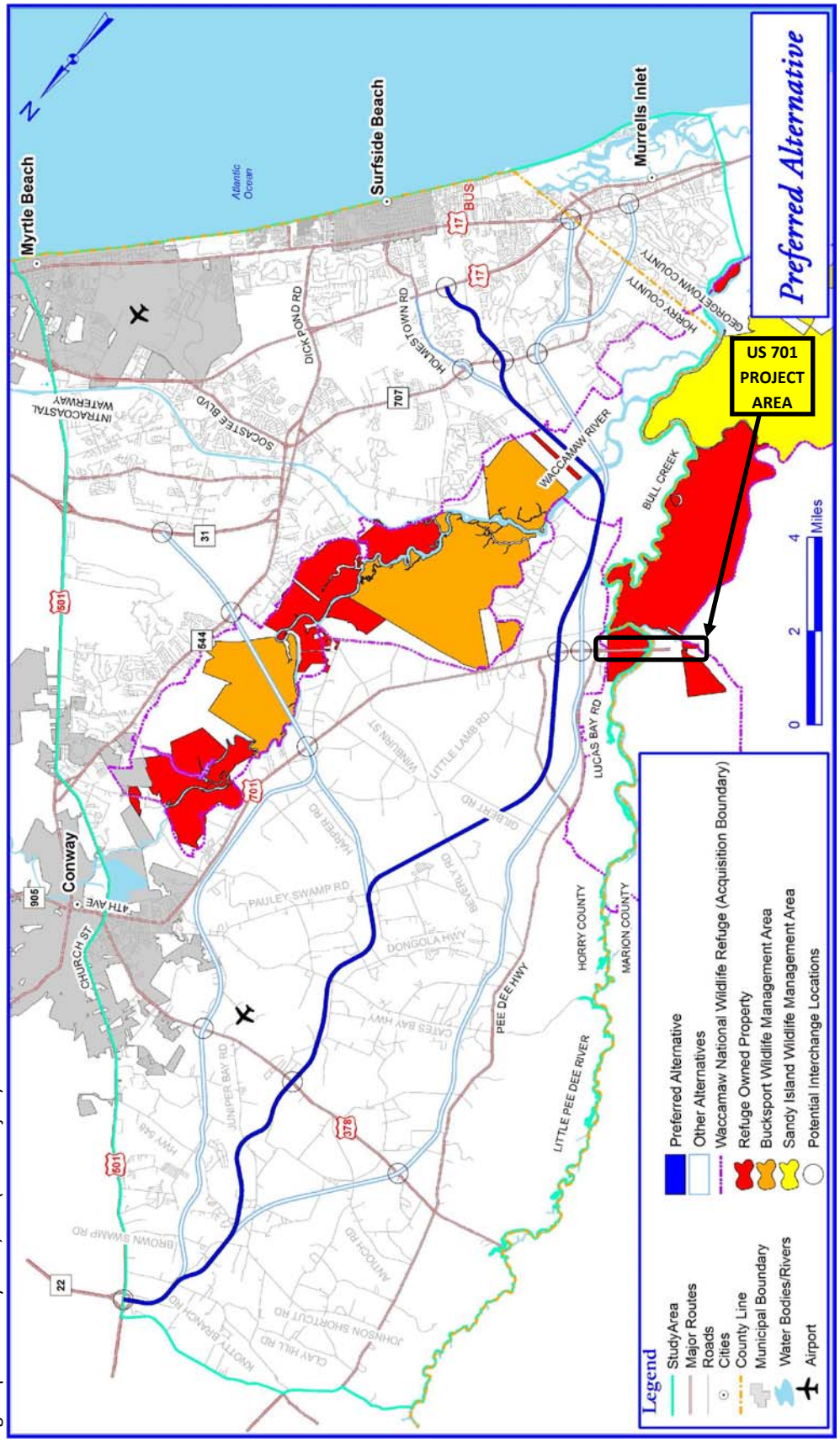


Figure provided by CECS, Inc. (SELL Project)

FIGURE 21

Map Provided by Thomas & Hutton, Myrtle Beach, SC

FIGURE 22

Bucksport Marine Industrial Park

The Grand Strand Water and Sewer Authority is currently planning an access road for the Bucksport Marine Industrial Park that will connect US 701 at the intersection with Old Pee Dee Road/Lucas Bay Road. This road would include an 800 foot long bridge over Cowford Swamp. See Figure 22.

All phases of this project, including the proposed roadway and bridge construction, infrastructure improvements, and building construction and operations, may have potential impacts to water quality and wetlands. However, the project will require going through the permitting process and construction precautionary measures to avoid or minimize harm to the environment.

Step 6 – Assess Potential Cumulative Impacts to Each Resource

Cumulative impacts on the environment are the impacts which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions[17]. The possible direct and indirect impacts due to the proposed project that could contribute to a cumulative impact were identified in Step 4. Step 4 also lists the resources that could be impacted by the proposed project's direct and indirect impacts. Step 5 identifies the other foreseeable future actions that may affect the resources. In this step (Step 6), the potential cumulative impacts will be assessed for each of the following resources:

- Water Quality;
- Threatened or Endangered Species;
- Wetlands;
- Terrestrial and Aquatic Wildlife;
- Historic Site 38GE18;
- Waccamaw National Wildlife Refuge; and,
- Horry County Public Boat Landing.

The following is an assessment of potential cumulative impacts on each of the resources listed above.

Water Quality – As mentioned under the direct and indirect impact analyses, through the implementation of Construction Best Management Practices (BMP's) reflecting policies contained in 23 CFR 650 B and S. C. Code of Regulations 72-400, other erosion control methods necessary to curtail runoff during construction, the use of SCDOT designated seeding techniques, and the fact that vehicular traffic should not significantly increase above the "no build" alternative; there should not be any potential direct or indirect impacts on Water Quality from the proposed project. It is expected that the foreseeable access road and bridge project for the Bucksport Marine Industrial Park should adopt

[17] FHWA Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process.

similar permitting and construction process. There should not be any potential cumulative impacts on Water Quality.

Wetlands – The wetland habitat of the Great Pee Dee River system in this area was partially fragmented due to the construction of the original US 701 causeway. However, at this time, the transmission line right of way (upstream of the current alignment) and the existing causeways carrying US 701 represent the only significant breaks in this wetland habitat for miles upstream and downstream along the Great Pee Dee River. Various alternative alignments were studied and compared to avoid and/or minimize impacts to the wetlands. As explained in the direct and indirect impact sections of this document, the proposed new longer bridges and removal of some existing fills that would be replaced by new bridges, would serve as some potential mitigation. No other on-site enhancement or creation options are considered practicable for the proposed US 701 Project, and therefore SCDOT plans to locate and acquire an appropriate property that will generate the compensatory mitigation credits required to compensate for unavoidable impacts associated with the proposed bridge replacements. It is expected that similar measures would be adopted for the foreseeable access road and bridge project for the Bucksport Marine Industrial Park. With the appropriate mitigations, there should not be any potential adverse cumulative impacts on Wetlands.

Threatened or Endangered Species - It is known that the endangered Shortnose sturgeon (*Acipenser brevirostrum*) and the endangered Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) begin spawning migration to the freshwater of the Great Pee Dee River during late winter into early summer. SCDOT committed a seasonal construction moratorium with consultation with NOAA Fisheries and concurrence. There should not be any potential adverse cumulative impacts on the Threatened or Endangered Species.

Terrestrial and Aquatic Wildlife - Removal of the existing bridges will remove these roosting structures for the Rafinesque's big ear bats; however, the existing bridges will not be removed until the new bridges are constructed, and the new bridges will provide new roosting structures. There should not be any potential adverse cumulative impacts on the Terrestrial and Aquatic Wildlife.

Archaeological Site 38GE18 - The SCDOT has determined that the proposed project would not have adverse impacts on cultural resources through the Section 106 process with concurrence from the SHPO/THPO. The SCDOT has made commitments that monitoring of this site will be performed by one of SCDOT's archeologists during ground disturbing activities. Also, personnel from SHPO and the Catawba Indian Nation THPO will be informed of these monitoring activities and afforded an opportunity to be present on-site if desired. Any archeological manifestations will be reported. SCDOT's commitments also include that if any significant portions of the site are encountered, construction activities in that area will be halted and it will be treated as a late discovery. There should be no potential adverse cumulative impacts on the Historic Site 38GE18.

Waccamaw National Wildlife Refuge - The proposed project would encroach into the refuge property. Compensatory mitigation will be carried out in coordination with USFWS as described in detail in the Programmatic 4(f) Evaluation in Appendix A. There should not be any potential adverse cumulative impacts on the Refuge once the mitigation is carried out.

Horry County Public Boat Landing – Current access to and from the existing Horry County Boat Landing facility needs improvements due to the location and configuration of the existing access roads. The SCDOT is committed to improving these access roads irrespective of which alignment alternative is selected for construction. The proposed US 701 Project would provide safer roads to and from the Boat Landing facility.

Specifically, the SCDOT is committed to enhancing the Horry County Boat Landing facility with the following:

- A new boat landing facility will be built on the Horry County side of the Great Pee Dee River, either on the upstream side or on the downstream side of the proposed new bridge.
- New access roads will be built to and from US 701.
- New parking spaces will be built.
- SCDOT will continue to coordinate with Horry County's engineering staff during the design development phase of this facility.

There should not be any potential adverse cumulative impacts on the Horry County Public Boat Landing facility. On the contrary, improved boat ramps, improved access roads, and improved parking areas will enhance the boat landing facility, and the overall cumulative impacts will be positive.

Step 7 – Report the Results

The assessment process for each resource can be mathematically expressed as follows:

BASELINE CONDITION	**+**	**PROJECT IMPACTS**	**+**	**FUTURE EFFECTS**
(Historical and Current)		(Direct and Indirect)		(Reasonably Foreseeable)

= CUMULATIVE IMPACTS

All the precautions and prevention measures adopted to avoid and/or minimize the proposed project's direct and indirect impacts also avoid and/or minimize the cumulative impacts. The assessment of the cumulative impacts in Step 6 indicates that the following resources should have no potential adverse cumulative impacts:

- Water Quality;
- Threatened or Endangered Species;

- Terrestrial and Aquatic Wildlife; Historic Site 38GE18;
- Archaeological Site 38GE18; and,
- Horry County Public Boat Landing.

However, the following resources will require compensatory mitigations:

- Wetlands; and,
- Waccamaw National Wildlife Refuge.

Mitigation details are discussed in Step 8.

Step 8 – Assess and Discuss Mitigation Issues for all Adverse Impacts

Mitigation includes all actions in the categories of avoidance, minimization, and compensation for potential adverse impacts.

The following describes the mitigation issues for all adverse impacts.

Wetlands - It appears that there is no practicable alternative to the proposed new construction in the wetland areas. Since the impacts are unavoidable, mitigation will be carried out in accordance with the USACE Standard Operating Procedures (SOPs). The policy specifies that first consideration should be given to mitigation within the right of way limits. This may include enhancement of existing wetlands or creation of new wetlands where possible. As the new bridge over the Great Pee Dee River will be at least 800 feet longer, removal of some existing causeway fill that would be replaced by new bridge construction may serve as some potential mitigation. No other on-site enhancement or creation options are considered practicable. By utilizing 2H:1V fill slopes, longer bridging, and by utilizing as much of the original causeway fill as possible and by placing the new fill adjacent to the existing fill, the wetland encroachment will be minimized. In addition to the above mentioned avoidance and minimization techniques, SCDOT plans to locate and acquire an appropriate property that will generate the compensatory mitigation credits required to compensate for unavoidable impacts associated with the proposed bridge replacements.

Reclamation of wetland areas temporarily lost through construction activities will involve returning disturbed areas to their original elevations to the extent practicable, allowing for adjacent vegetation to naturally reclaim the area.

After the mitigation process, there should not be any potential cumulative impacts on wetlands.

Waccamaw National Wildlife Refuge - The proposed project would encroach into the refuge property. The following compensatory mitigation will be carried out by the SCDOT:

1) ***Move New US 701 Alignment to the Upstream of the Current Alignment –*** The USFWS showed preference in the new US 701 alignment to be located on the upstream side of the current alignment. Alignment Alternative 3 (55 feet downstream of the existing alignment)

would have the least wetland impacts and least property relocations. The SCDOT will adopt Alignment Alternative 2 (55 feet upstream of the current alignment) which will cause approximately 1 Acre of additional wetland impacts and more property relocations.

2) ***Add a Left Turn Lane on US 701 at the Entrance of the Waccamaw Wildlife Refuge Visitors Center –*** Currently, the vehicles wait on the southbound lane of US 701 until there is an opportunity to turn left at the entrance of the visitors center. This is not a safe situation considering the current location of the entrance road and the high speed southbound traffic coming off the bridge. The addition of a left turn lane will enhance the safety at this location.

3) ***Monitoring of Archaeological Site 38GE18 –*** A large portion of Archaeological Site 38GE18 has been severely damaged or destroyed. However, a 20-foot wide strip on the USFWS property is intact and contributes to the National Register eligibility of the site. The SCDOT has made a commitment of monitoring of this site by one of the Department's archaeologists during ground disturbing construction activities.

4) ***Mitigate Right of Way Acquisition from the USFWS Property –*** Due to the encroachment of the proposed project into the Refuge property, the Department will acquire minimal strips of property from the Refuge. See Programmatic Section 4(f) Evaluation section for details.

By applying avoidance and minimization strategies as well as the above mentioned compensatory mitigation, there should not be any potential cumulative impacts on the Refuge and also on local and surrounding resources and environment.

V. COORDINATION

On-site meetings at the Horry County public boat landing beneath the Great Pee Dee River Bridge were held on April 28, 2005 and October 4, 2005 (for the Meeting Minutes see the Appendix B , beginning Page B-200) where various issues regarding the characteristics of the project and potential impacts to the natural and human environment were discussed. Various affected agency representatives and other interested parties were in attendance. The first meeting was attended by the representatives from SCDOT and its consultant, the Federal Highway Administration (FHWA), the U.S. Fish and Wildlife Service (USFWS), the South Carolina Department of Natural Resources (SCDNR), the South Carolina Department of Health and Environmental Control (SCDHEC), the National Oceanic and Atmospheric Administration (NOAA), the South Carolina Department of Archives and History, and the Horry County Maintenance Department. The project was presented and comments were received from the various parties. At this meeting, it was discussed that both upstream and downstream alternatives were being studied and agency representatives were given an opportunity to present their preferences. Comments related to this meeting generally included preferences for an upstream alignment, longer bridging, removal of causeway fill, utilization of existing causeway fill to the extent possible, further fragmentation of the habitat, minimizing impacts to wetlands, wildlife and floodwater passage, the sensitivities of various species in the corridor, and the potential impacts to the public boat landing.

The second on-site meeting held on October 4, 2005 was attended by the representatives from SCDOT and its consultant, the Federal Highway Administration (FHWA), the U.S. Fish and Wildlife Service (USFWS), the South Carolina Department of Natural Resources (SCDNR), and the Horry County Maintenance Department. During this meeting, similar topics as in the previous meeting were discussed; however, four conceptual alignments were presented, and it was shown that the 55 foot downstream alternative (Alternative 3) was potentially the best alternative due to the various design criteria, as well as minimized impacts to the wetlands and the least number of relocations and property impacts. Other issues discussed included potential impacts to the proposed USFWS Visitors Center on the Yauhannah Bluff property and the agreements between the Department and USFWS regarding the buffer areas set aside to address the Section 4(f) issues.

A meeting with USFWS representatives was also held at the Department on May 2, 2008. The project was reintroduced after being put on hold for an extended period due to right of way issues. Alternative 3 (55 feet downstream) was again put forth as the preferred alternative due to the various design criteria, as well as minimized impacts to the wetlands and the fewest relocations and property impacts. USFWS concerns included the sensitivity of the Cowford Swamp area, the sensitivities of various species, the construction of the refuge visitor center, noise impacts, wildlife and floodwater passage, and clarity on the easement issues. Issues brought up during the coordination process have been incorporated into the research process of this assessment and are further described in the various sections of this document.

A noise impact study report was completed on May 28, 2009. A copy of the noise report was forwarded to USFWS on August 18, 2009. A copy of the noise report was also forwarded to the Waccamaw Regional Council of Governments on August 31, 2009.

On June 17, 2008, an informal drop-in format public meeting was held from 4:00 pm to 6:00 pm at the Mt. Tabor Baptist Church at the intersection of US 701 and Tabor Drive. Approximately 127 people attended the meeting. Attendees were presented information regarding the preliminary design of the project and an opportunity to comment on the undertaking, see the Appendix B, beginning on Page B-234. A significant majority of the citizen comments were in favor of the bridge replacement project. Most of the citizens in attendance recognized the need for the bridge replacement for safety reasons and most also agreed that due to the considerable traffic detour that would result if the existing bridges were shut down, the existing bridges should stay open during construction of the project. A representative of the Coastal Conservation League provided comments regarding the project and stated that an Environmental Assessment should be conducted to consider direct and cumulative impacts.

A follow-up meeting was held with USFWS on September 29, 2009 (for the Meeting Minutes, see the Appendix B, Page B-208) at the new USFWS Waccamaw National Wildlife Refuge Visitors Center. FHWA was also present at the meeting. The purpose of the meeting was to convey the information on SCDOT's progress on the project, coordinate with USFWS the proposed entrance from US 701 to the Visitors Center so that this item can be incorporated in the US 701 roadway design, and review the plans for future development of the refuge property. USFWS expressed concerns about future traffic noise, and encroachment of construction on the Cowford Lake area,

and Swallow Tail Kite nesting sites. Prior to the meeting, USFWS was provided a copy of the Draft Noise Report prepared for this project. USFWS expressed concerns that the receptors for the noise analysis were residential and not some of the natural areas. It was explained to USFWS that the noise analysis was performed in accordance with the Noise Abatement Criteria (NAC). There are no criteria for non-humans, and the refuge, therefore, will be treated like a park where people gather. The refuge manager wanted a quite refuge Visitors Center and preferred the new roadway away from the new Visitors Center. However, he recognized that there was an agreement in place for the road encroaching into the refuge. The other USFWS concern was regarding wildlife passage. Current passages are through the bridge opening. The new replacement bridges will be longer than the existing bridges and therefore, will provide more opportunities for wildlife passage. There are no other passages in the existing facility. USFWS would prefer a new wildlife passage closer to the upland portion of the highway where smaller animals, such as reptiles, are being struck by traffic. USFWS will provide the as-built plans of the Visitors Center access road. SCDOT will include the design of a deceleration lane to provide a safe entrance to the refuge property. The design will also include adequate line of site for all drivers exiting the Visitors Center, including the school bus drivers carrying children. USFWS also indicated that upon completion of the EA, they will perform a Compatibility Determination based on the Refuge Improvement Act.

The project hydraulic analysis and design is being carried out based on SCDOT guidelines and applicable FEMA regulations. The one-dimensional hydraulic analysis has been completed and was forwarded to the FEMA coordinators of both Georgetown and Horry Counties on October 9, 2009. See the Appendix B, Pages B-197 and B-198 for these two letters.

With input received at that time from various agencies and the public, the Department selected Alternative 3 (55 feet downstream) as the preferred alternative.

In October 2009 the Department and the FHWA published an Environmental Assessment document for this project, identifying Alignment Alternative 3 (Downstream) as the preferred alignment. On November 10, 2009, from 6:00 p.m. to 8:00 p.m., SCDOT hosted a Location and Design Public Hearing at the Mount Tabor Baptist Church. Engineers, environmental planners, and rights-of-way agents attended the meeting to greet citizens, to provide project details, and to answer questions. The project team distributed hand-outs containing project particulars and displayed maps and exhibits that included, among other items, the proposed alignment and cross-section. Just over fifty (50) citizens attended the hearing which included an informal question and answer period as well as a formal recorded period that included SCDOT's verbal presentation and one (1) person's verbal comments. One (1) person issued a written comment at the hearing, and one (1) person submitted a letter containing comments. SCDOT also received two (2) letters from regulatory agencies containing comments. The public hearing transcript as well as the written comment and letters, and SCDOT's written responses are included in the Appendix B, beginning on Page B-251.

In 2009, upon completion of the EA, USFWS questioned the property ownership information presented in the EA and expressed concern about the downstream preferred alignment. FHWA, SCDOT and USFWS conducted coordination meetings on September 29, 2009, September 13, 2011, March 15, 2012, April 17, 2012, and July 17, 2012. Minutes of these meetings are contained in the Appendix B, beginning on Page B-208. In September 2012, after a lengthy coordination effort between the FHWA,

SCDOT, and USFWS and after further detailed analysis, SCDOT agreed to pursue a new upstream and parallel preferred alignment. On September 13, 2012, the project status was presented in the Agency Coordination Effort (ACE) meeting. The ACE meeting is a regularly scheduled meeting at which all regulatory agencies are invited to learn about upcoming/ongoing highway projects and to express any concerns. Copies of the agenda, meeting summary, and handouts for this September 13, 2012 ACE meeting are included in the Appendix, Page B-221. FHWA, SCDOT, and USFWS had another meeting on February 15, 2013 to discuss the status of the EA and to continue discussion of project mitigation. The revised EA, included herein, summarizes this coordination effort and validates the new preferred upstream alignment. A copy of the Minute-Memorandum of this meeting is included in the Appendix B, Page B-221.